Sun Fire™ X4100 and Sun Fire X4200 Servers Service Manual

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Preface

This *Sun Fire X4100 and Sun Fire X4200 Servers Service Manual* contains information and procedures for maintaining and upgrading the servers.

Before You Read This Document

It is important that you review the safety guidelines in the *Sun Fire X4100 and Sun Fire X4200 Servers Safety and Compliance Guide* (819-1161).

Product Updates

For product updates that you can download for the Sun Fire X4100 or Sun Fire X4200 servers, please visit the following Web site:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

This site contains updates for firmware and drivers, as well as CD-ROM `.iso` images.

Related Documentation

For a description of the document set for the Sun Fire X4100 and Sun Fire X4200 servers, see the Where To Find Documentation sheet that is packed with your system and also posted at the product's documentation site. See the following URL, then navigate to your product.

`http://www.sun.com/documentation`

Translated versions of some of these documents are available at the web site described above in French, Simplified Chinese, Traditional Chinese, Korean, and Japanese. English documentation is revised more frequently and might be more up-to-date than the translated documentation.

For all Sun hardware documentation, see the following URL:

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For Solaris and other software documentation, see the following URL:

`http://docs.sun.com`

Using UNIX Commands

This document might not contain information about basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at:

  `http://docs.sun.com`

Typographic Conventions

Typeface*	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

* The settings on your browser might differ from these settings.

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Sun Fire X4100 and Sun Fire X4200 Servers Service Manual, part number 819-1157-15

CHAPTER 1

Introduction to the Sun Fire X4100 and Sun Fire X4200 Servers

This chapter contains overviews of the Sun Fire™ X4100 and Sun Fire X4200 servers, including features and orderable components.

1.1 Features of the Servers

The Sun Fire X4100 and Sun Fire X4200 servers were designed to take full advantage of the exceptional power and performance of the AMD Opteron™ processor.

The servers include an extensive set of reliability, availability, and serviceability (RAS) features. The servers also provide a remote, integrated lights-out management (ILOM) service processor function, including remote boot and remote software upgrades.

TABLE 1-1 summarizes the features of the Sun Fire X4100 and Sun Fire X4200 servers.

TABLE 1-1 Summary Comparison of Features

Feature or Component	Sun Fire X4100 Server	Sun Fire X4200 Server
CPU	Two AMD64 Opteron dual-core processors (1MByte L2 cache per CPU chip)	Two AMD64 Opteron dual-core processors (1MByte L2 cache per CPU chip)
Memory	Up to eight DIMMs (up to 32GB capacity) Qualified DIMMs: • PC3200 400-MHz Registered ECC DIMMs • PC2700 333-MHz Registered ECC DIMMs (512MB, 1GB, or 2GB per DIMM)	Up to eight DIMMs (up to 32GB capacity) Qualified DIMMs: • PC3200 400-MHz Registered ECC DIMMs • PC2700 333-MHz Registered ECC DIMMs (512MB, 1GB, or 2GB per DIMM)
Hard disk drives (HDDs)	Two Serial-Attached SCSI (SAS) HDDs (2.5 inch or 63.5 mm); up to four HDDs as a factory-configured option	Four Serial-Attached SCSI (SAS) HDDs (2.5 inch or 63.5 mm)
Board management controller (BMC)	Motorola MPC8248 @ 266MHz	Motorola MPC8248 @ 266MHz
RAID options	Four-channel SAS RAID disk controller	Four-channel SAS RAID disk controller
Network I/O	• Four 10/100/1000BASE-T Gigabit Ethernet ports (RJ-45 connectors) • One 10/100BASE-T Ethernet management port (RJ-45 Connector) • One RS-232 serial port (RJ-45 Connector)	• Four 10/100/1000BASE-T Gigabit Ethernet ports (RJ-45 connectors) • One 10/100BASE-T Ethernet management port (RJ-45 Connector) • One RS-232 serial port (RJ-45 Connector)
PCI I/O	**Sun Fire X4100:** • One 133-MHz low-profile PCIX slot • One 100-MHz low-profile PCIX slot	**Sun Fire X4200:** • One 133-MHz PCIX slot • One 100-MHz PCIX slot • Three 66-MHz PCIX slots
Other I/O	**Sun Fire X4100:** • Three USB 1.1 ports • One VGA video port	**Sun Fire X4200:** • Four USB 1.1 ports • One VGA video port
Removable media devices	Internal slim DVD-ROM drive (not available if four-HDD option is ordered)	Internal slim DVD-ROM drive
Power	Two 550W power supplies	Two 550W power supplies
Fans	Six front fan modules, containing 12, 40-mm fans; also one fan in each power supply	Six front fan modules, containing 6, 80-mm fans; one rear fan tray; also one fan in each power supply

1.2 Sun Fire X4100 Server Orientation

This section contains illustrations that you can use to become familiar with the components of the Sun Fire X4100 server.

1.2.1 Sun Fire X4100 Server Front Panel Features

FIGURE 1-1 shows the features of the front panel.

FIGURE 1-1 Sun Fire X4100 Server Front Panel

1.2.2 Sun Fire X4100 Server Back Panel Features

FIGURE 1-2 shows the features of the back panel.

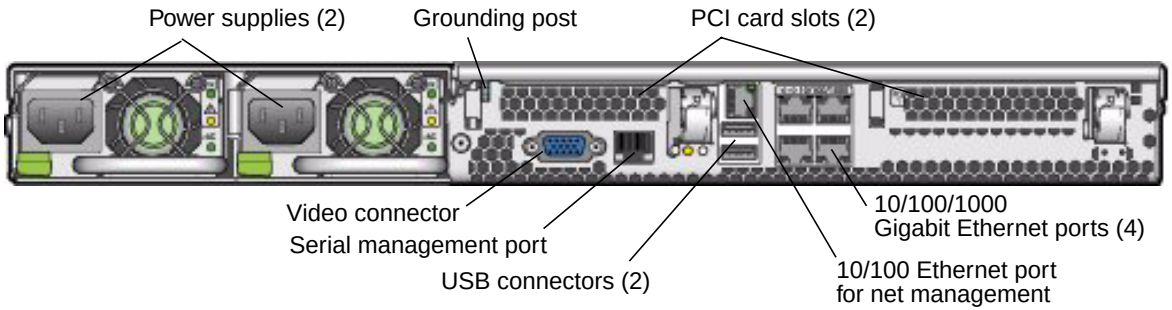


FIGURE 1-2 Sun Fire X4100 Server Back Panel

1.2.3 Sun Fire X4100 Server Components

FIGURE 1-3 shows the locations of the Sun Fire X4100 server replaceable components, with the top covers removed.

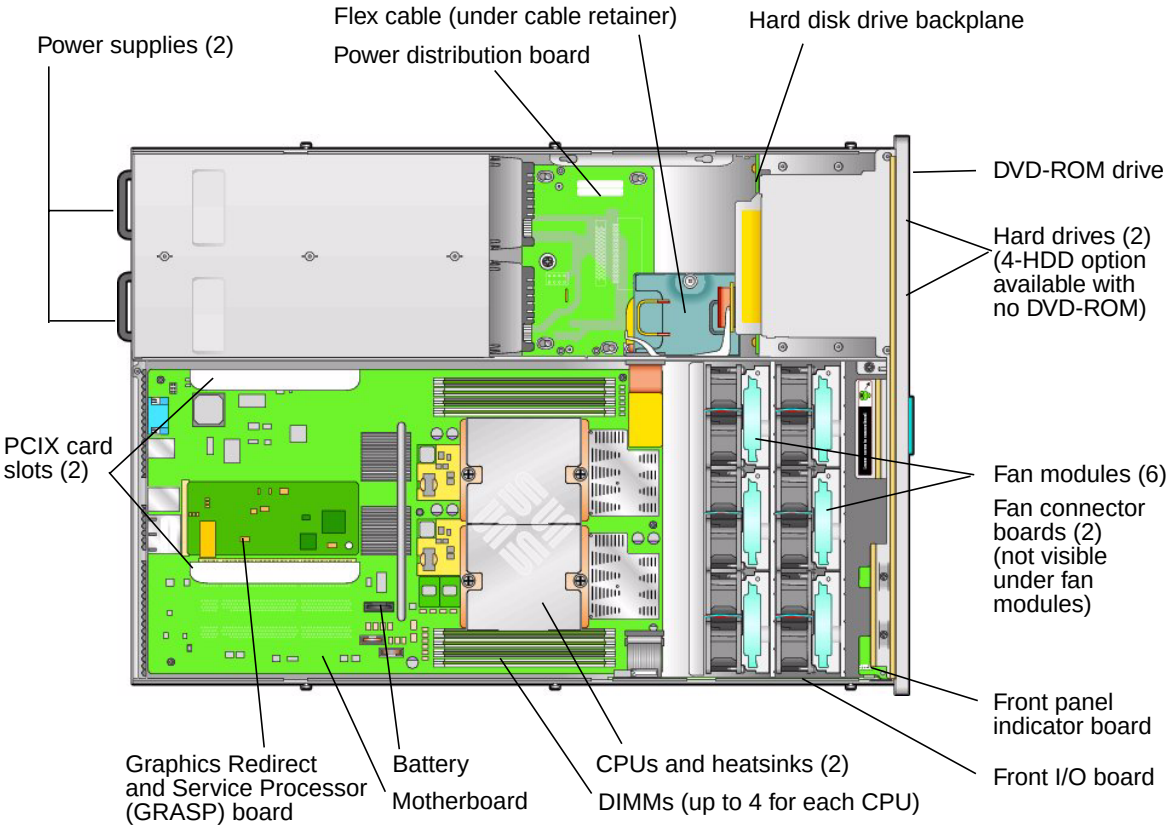


FIGURE 1-3 Sun Fire X4100 Replaceable Component Locations

1.3 Sun Fire X4200 Server Orientation

This section contains illustrations that you can use to become familiar with the components of the Sun Fire X4200 server.

1.3.1 Sun Fire X4200 Server Front Panel Features

FIGURE 1-4 shows the features of the front panel.

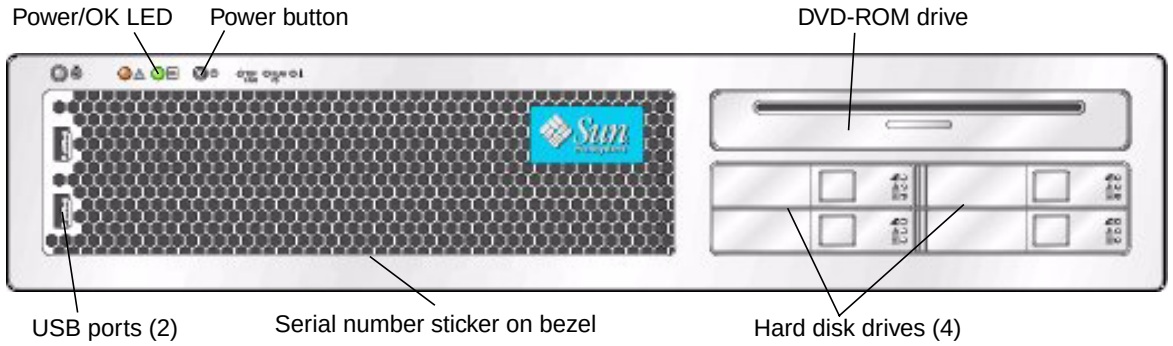


FIGURE 1-4 Sun Fire X4200 Server Front Panel

1.3.2 Sun Fire X4200 Server Back Panel Features

FIGURE 1-5 shows the features of the back panel.

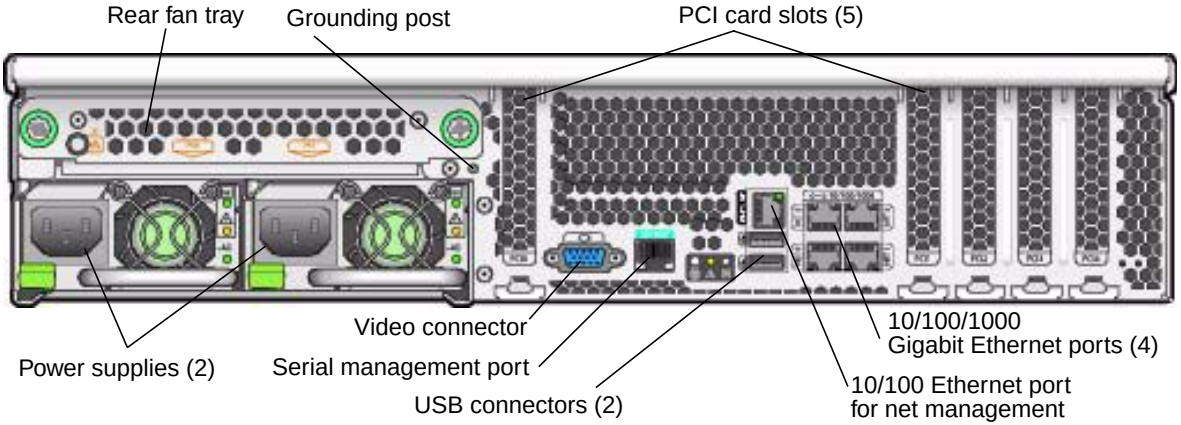


FIGURE 1-5 Sun Fire X4200 Server Back Panel

1.3.3 Sun Fire X4200 Server Components

FIGURE 1-6 shows the locations of the Sun Fire X4200 server replaceable components, with the top covers removed.

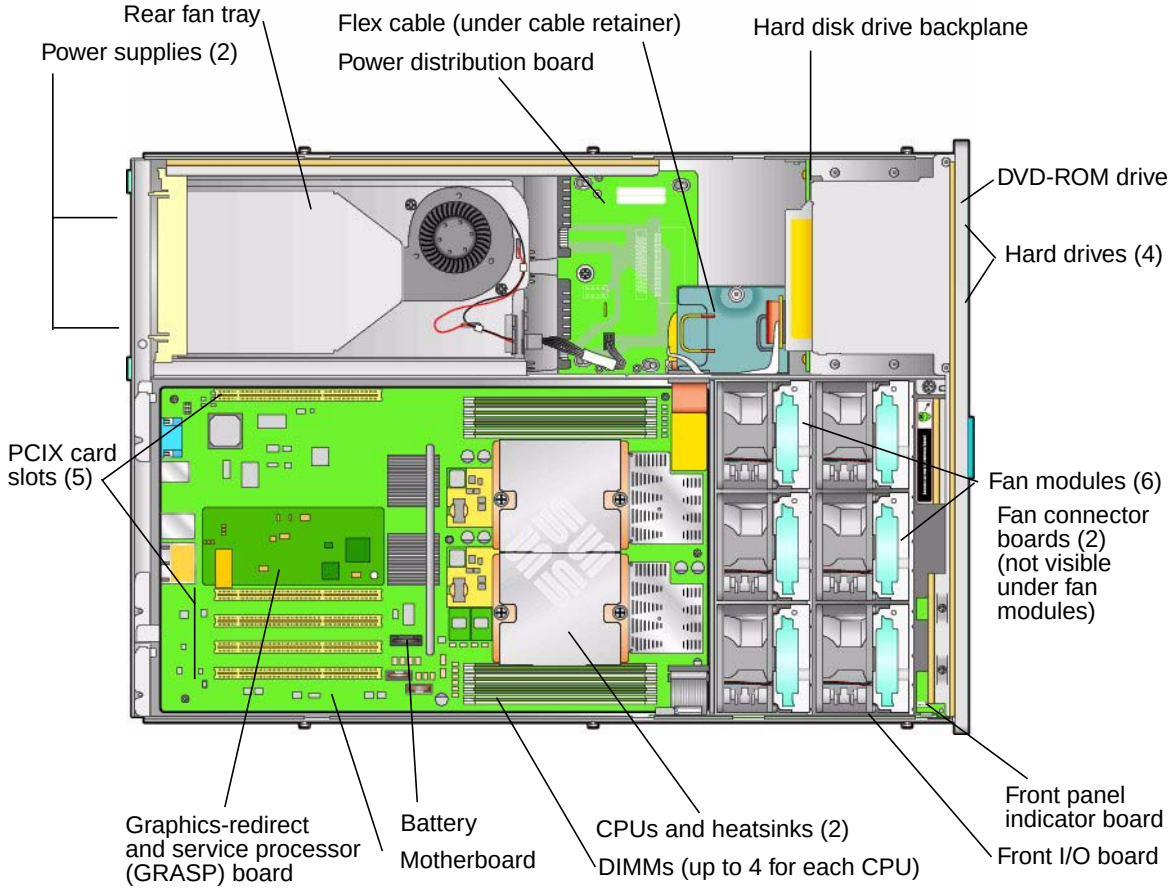


FIGURE 1-6 Sun Fire X4200 Replaceable Component Locations

1.4 Accessory Kits

TABLE 1-2 lists the contents of the accessory kit that is shipped with the Sun Fire X4100 and Sun Fire X4200 servers.

TABLE 1-2 Sun Fire X4100 and Sun Fire X4200 Accessory Kit

Item	Part Number
Sun Fire X4100 and Sun Fire X4200 Servers Tools and Drivers CD (In earlier servers, this CD was called the Resource CD.)	705-1438
Sun Fire X4100 and Sun Fire X4200 Servers Bootable Diagnostics CD	705-1439
Sun Fire X4100 and Sun Fire X4200 Servers Sun Installation Assistant CD	705-1440
Sun N1 System Manager DVD (depending on availability)	825-6459
Sun Fire X4100 and Sun Fire X4200 Servers Installation Guide (printed manual)	819-1155
Where to Find Sun Fire X4100 and Sun Fire X4200 Servers Documentation (printed sheet)	819-3119
Serial-to-RJ45 cable adapter (DB9S-to-RJ-45F)	530-3100

1.5 Additional Options and Replaceable Components

TABLE 1-3 lists the after-factory options and replaceable components for the Sun Fire X4100 and Sun Fire X4200 servers. Items that are specific to only one of the servers are noted in the first two columns of the table. Whether the items are customer-replaceable units (CRUs) or field-replaceable units (FRUs) is indicated in the last column of the table.

Supported components and their part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

Note – The Sun Fire X4100 and Sun Fire X4200 servers are now fully compliant with the Reduction of Hazardous Substances (RoHS) Directive. TABLE 1-3 indicates where new part numbers have been assigned to new RoHS-compliant components.

TABLE 1-3 Sun Fire X4100 and Sun Fire X4200 Servers Replaceable Components

Sun Fire X4100	Sun Fire X4200	Component	Part Number	CRU or FRU
		CPUs		
X	X	AMD 248 (2.2 GHz) Opteron single-core CPU	370-7711	FRU
X	X	AMD 252 (2.6 GHz) Opteron single-core CPU	370-7272	FRU
X	X	AMD 254 (2.8 GHz) Opteron single-core CPU	370-7962	FRU
X	X	AMD 256 (3.0 GHz) Opteron single-core CPU	371-1776	FRU
X	X	AMD 270 (2.0 GHz) Opteron dual-core CPU	370-7799	FRU
X	X	AMD 275 (2.2 GHz) Opteron dual-core CPU	370-7800	FRU
X	X	AMD 280 (2.4 GHz) Opteron dual-core CPU	371-0839	FRU
X	X	AMD 285 (2.6 GHz) Opteron dual-core CPU * See the caution after this table.	371-0856	FRU
		Memory		
X	X	1 GB (DIMM pair 2 x 512-MB DDR1/400)	540-6454	CRU
X	X	2 GB (DIMM pair 2 x 1-GB DDR1/400)	540-6453	CRU
X	X	4 GB (DIMM pair 2 x 2-GB DDR1/400)	540-6497	CRU
		Hard Disk Drives and Optical Drives		
X	X	36-GB 10K RPM 2.5-inch SAS drive (RoHS-compliant, replaces 540-6358)	540-6610	CRU
X	X	73-GB 10K RPM 2.5-inch SAS drive (RoHS-compliant, replaces 541-0323)	540-6611	CRU
X	X	Slim-slot DVD-ROM drive (RoHS-compliant, replaces 540-6368)	390-0320	FRU

TABLE 1-3 Sun Fire X4100 and Sun Fire X4200 Servers Replaceable Components *(Continued)*

Sun Fire X4100	Sun Fire X4200	Component	Part Number	CRU or FRU
		PCIX Cards		
X	X	LSI single-port U320 SCSI HBA	375-3255	CRU
X	X	2-GB single-port x86 HBA	375-3253	CRU
X	X	2-GB dual-port Fibre Channel HBA	375-3108	CRU
X	X	4-GB single-port Fibre Channel HBA	375-3354	CRU
X	X	4-GB dual-port Fibre Channel HBA	375-3294	CRU
X	X	Sun 2-port 4x IB HCA, LP	375-3260	CRU
X	X	Dual Gigabit-Ethernet (copper)	371-0911	CRU
X	X	Dual Gigabit-Ethernet (Fibre Channel)	371-0912	CRU
X	X	Sun 10-GB Ethernet LP	375-3301	CRU
		Boards and Other Components		
X	X	Power supply (550W) (RoHS-compliant, replaces 300-1757)	300-1945	CRU
X		Fan tray assembly (Sun Fire X4100 fan module)	541-0266	CRU
	X	Fan tray assembly (Sun Fire X4200 fan module)	541-0269	CRU
	X	Blower tray assembly (Sun Fire X4200 rear fan tray)	541-0645	CRU
X	X	Flex cable assembly	541-0648	FRU
X	X	Ribbon cable (front I/O interconnect cable)	530-3338	CRU
X		Motherboard, Sun Fire X4100 (RoHS-compliant, replaces 501-7261 and 501-7644)	501-7513	FRU
	X	Motherboard, Sun Fire X4200 (RoHS-compliant, replaces 501-6974 and 501-7645)	501-7514	FRU
X	X	Power distribution board	501-6920	FRU
X		Front I/O board (for Sun Fire X4100)	501-6918	FRU
	X	Front I/O board (for Sun Fire X4200)	501-6978	FRU
X	X	Fan connector board	501-6917	CRU
X	X	Indicator board (front panel)	501-6916	CRU
X		Hard disk drive backplane (for Sun Fire X4100)	501-6919	FRU
	X	Hard disk drive backplane (for Sun Fire X4200) This backplane is also used in Sun Fire X4100 servers that have the four-HDD option)	501-6976	FRU

TABLE 1-3 Sun Fire X4100 and Sun Fire X4200 Servers Replaceable Components *(Continued)*

Sun Fire X4100	Sun Fire X4200	Component	Part Number	CRU or FRU
X	X	PCIX riser board	501-6914	CRU
X	X	Graphics Redirect and Service Processor (GRASP) board	501-6979	CRU
X	X	Rail kit for rack mounting	370-7669	CRU
X	X	Cable management arm (CMA) for rack mounting	370-7668	CRU
X	X	Battery, system	150-3993	CRU

Caution – Some AMD CPUs are released as Special Editions, which might differ in wattage from non-Special Edition versions of the CPU. Do not mix Special Edition CPUs with non-Special Edition versions. Always make sure that all CPUs in the server have the same part number.

CHAPTER 2

Powering On and Configuring BIOS Settings

This chapter contains the following procedures and information:

- Section 2.1, "Powering On the Server" on page 2-2
- Section 2.2, "Powering Off the Server" on page 2-3
- Section 2.3, "Configuring BIOS Settings" on page 2-4
- Section 2.4, "Resetting SP and BIOS Passwords Using Jumper P4" on page 2-28
- Section 2.5, "Using the Force-Recovery Jumper P5" on page 2-31
- Section 2.6, "Using the Clear CMOS Jumper TP51/TP52" on page 2-32
- Section 2.7, "Using the Reset and NMI Switches" on page 2-33
- Section 2.8, "Updating the BIOS" on page 2-34

2.1 Powering On the Server

Note – Before powering on your server for the first time, follow the installation and cabling instructions provided in the *Sun Fire X4100 and Sun Fire X4200 Servers Installation Guide*, which is shipped with the system and is also available online at the URL described in "Related Documentation" on page -xii.

Caution – Do not operate the server without all fans, component heatsinks, air baffles, and covers installed. Severe damage to server components can occur if the server is operated without adequate cooling mechanisms.

1. **Verify that AC power cords have been connected to the server's power supplies and that standby power is on.**

   In standby power mode, the Power/OK LED on the front panel flashes, indicating that the service processor is working and the system is ready to be fully powered on to main power mode. See FIGURE 2-1 or FIGURE 2-2 for the LED location.

2. **Use a ballpoint pen or other stylus to press and release the recessed Power button on the server front panel. See** FIGURE 2-1 **or** FIGURE 2-2 for the Power button location.

   When main power is applied to the full server, the Power/OK LED next to the Power button lights and remains lit.

FIGURE 2-1 Sun Fire X4100 Server Front Panel

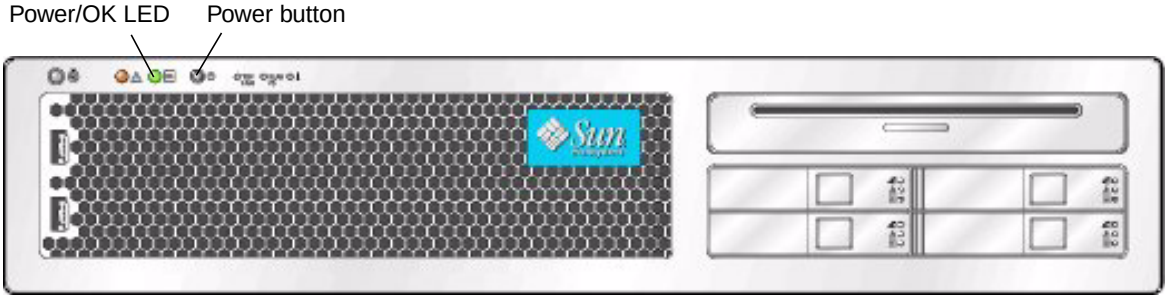


FIGURE 2-2 Sun Fire X4200 Server Front Panel

2.2 Powering Off the Server

1. **Choose a method for shutting down the server from main power mode to standby power mode.**
   - **Graceful shutdown:** Use a ballpoint pen or other stylus to press and release the Power button on the front panel. This causes Advanced Configuration and Power Interface (ACPI) enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems will shut down to standby power mode immediately.
   - **Emergency shutdown:** Press and hold the Power button for four seconds to force main power off and enter standby power mode.

   When main power is off, the Power/OK LED on the front panel will begin flashing, indicating that the server is in standby power mode.

Caution – When you use the Power button to enter standby power mode, power is still directed to the Graphics Redirect and Service Processor (GRASP) board and power supply fans, indicated when the Power/OK LED is flashing. To completely power off the server, you must disconnect the AC power cords from the back panel of the server.

2.3 Configuring BIOS Settings

This section describes how to view and/or modify the BIOS settings.

The Basic Input/Output System (BIOS) has a Setup utility stored in the BIOS flash memory. The Setup utility reports system information and can be used to configure the BIOS settings. The configured data is provided with context-sensitive Help and is stored in the system's battery-backed CMOS RAM. If the configuration stored in the CMOS RAM is invalid, the BIOS settings will default to the original state specified at the factory.

The first BIOS Setup menu screen is displayed. The BIOS Setup utility contains seven menu screens, which are displayed in this order: Main, Advanced, PCI/PnP, Boot, Security, Chipset, and Exit.

Use the left and right arrow keys to move sequentially back and forth through the seven screens. Fields that can be reconfigured are displayed in color. All other fields are non-configurable. Use the up and down arrows, on the keyboard, to scroll through a screen's menu. Use the Tab key to move back and forth across columns.

2.3.1 Changing the Configuration of a BIOS Menu Item

You can change the BIOS configuration in several different interfaces:

- Use a USB keyboard and mouse, and a VGA monitor connected directly to the server.
- Use the remote video console of the ILOM Service Processor and redirect the server's console output. See Section B.1.2, "Redirecting Console Output" on page B-2.
- Use a terminal (or terminal emulator connected to a computer) through the serial port on the back panel of the server.

1. **To change the system's parameters, enter the BIOS Setup utility by pressing the F2 key while the system is performing the power-on self-test (POST).**

   POST testing is indicated when the Power/OK LEDs on the front and back panels go into slow-blink mode.

2. **Highlight the field to be modified using the arrow and Tab keys.**

3. **Press Enter to select the field.**

   A dialog box appears. The box presents you with the options available for the setup field that you have chosen.

4. **Modify the setup field and close the screen.**
5. **If you need to modify other setup parameters, use the arrow and Tab keys to navigate to the desired screen and menu item, then repeat Steps 1 through 3. Otherwise, go to Step 5.**
6. **Press and release the right arrow key until the Exit menu screen is displayed.**
7. **Follow the instructions on the Exit menu screen to save your changes and exit the Setup utility.**

2.3.2 BIOS Considerations

This section contains information and considerations regarding the system BIOS.

2.3.2.1 PCI Card Slot Booting Priority

See Section 3.4.14, "Replacing PCI Cards" on page 3-60 for Sun Fire X4100 servers or Section 4.4.14, "Replacing PCI Cards" on page 4-61 for Sun Fire X4200 servers for the locations of the PCI slots.

The slots for the PCI cards are detected by the BIOS during startup in this order:

- Sun Fire X4100: PCIX Slot 0, PCIX Slot 1
- Sun Fire X4200: PCIX Slot 0, PCIX Slot 2, PCIX Slot 3, PCIX Slot 4, PCIX Slot 1

2.3.2.2 BIOS Option ROM Size Limitation

The BIOS Option ROM is 128 KB. Of these 128 KB, approximately 80 KB are used by the VGA controller, the LSI controller, and the network interface card. Approximately 48 KB remain for the Option ROM.

2.3.2.3 AMD PowerNow! Feature Disabled by Default

The AMD PowerNow! feature, which is accessed from the BIOS Setup utility Advanced menu, is disabled by default on Sun Fire X4100 and Sun Fire X4200 servers. Some problems have been observed when using this feature on certain operating systems. If you want to enable this feature, first check the *Sun Fire X4100 and Sun Fire X4200 Servers Product Notes* (819-1162) for any outstanding known issues for your operating system.

2.3.3 Descriptions of the BIOS Setup Screens

TABLE 2-1 contains summary descriptions of the seven top-level BIOS setup screens.

TABLE 2-1 BIOS Setup Screens Summary

Screen	Description
Main	General system information.
Advanced	Configuration interface for the CPUs, IDE, SuperIO, ACPI, Event Log, HyperTransport, IPMI, MPS, PowerNow!, Remote Access, and USB.
PCI/PnP	Plug-and-Play (PnP) devices can be configured by the BIOS (default), or by the operating system (if applicable).
Boot	Configure the boot device priority (hard disk drives and the ATAPI DVD-ROM drive).
Security	Install or change the user and supervisor passwords.
Chipset	Configuration options for the NorthBridge and SouthBridge devices, and PCI-X devices. Note that the Memory Chipkill option is enabled by default. Enabling Chipkill improves system reliability but degrades system performance under specific applications.
Exit	Save or discard changes.

FIGURE 2-3 summarizes the BIOS menu tree, with differences between versions of the server noted. See Section 2.3.4, "BIOS Setup Menu Screens" on page 2-8 for examples of each of these screens.

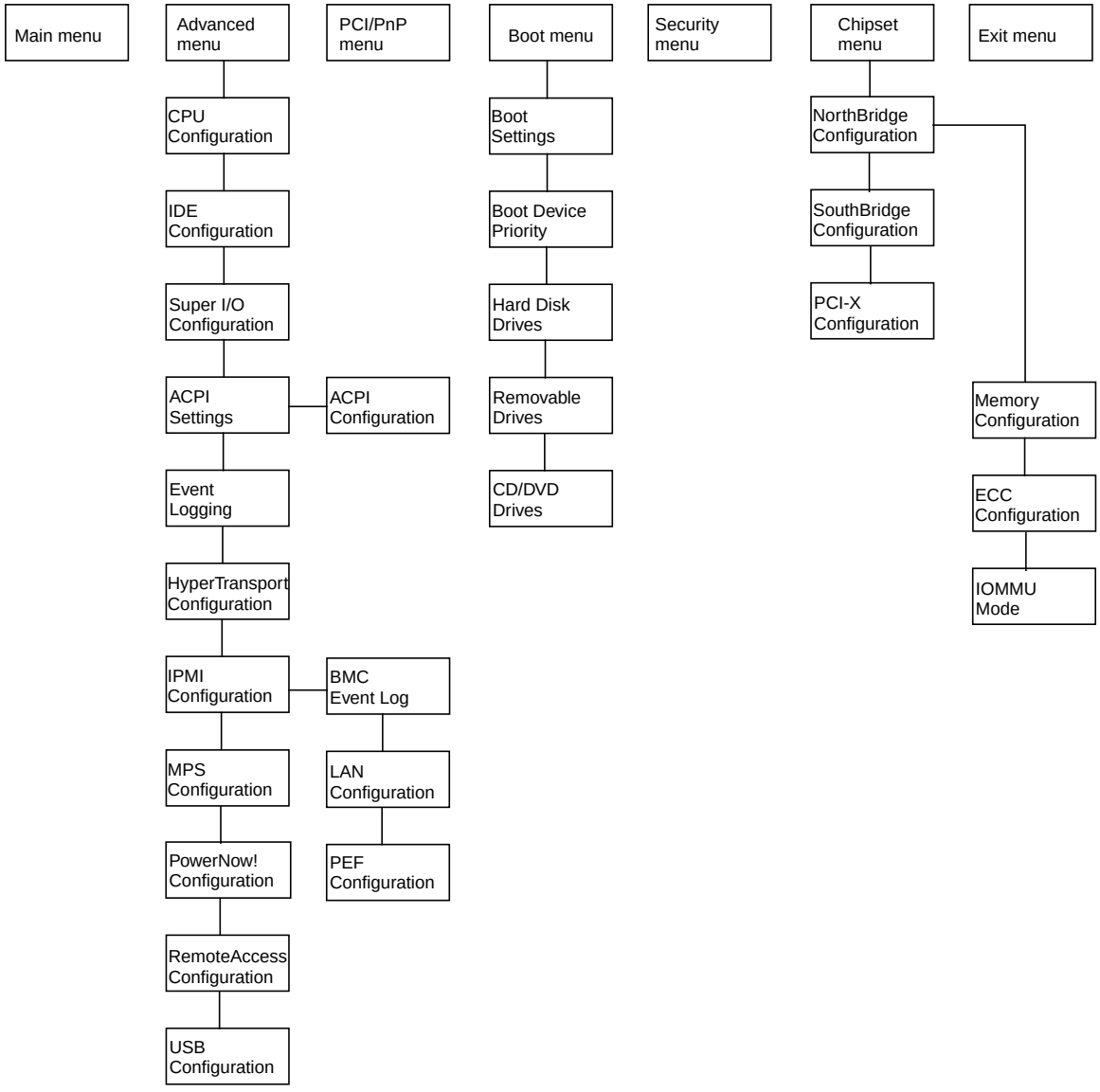


FIGURE 2-3 BIOS Menu Tree

2.3.4 BIOS Setup Menu Screens

The following figures show sample BIOS setup menu screens.

Note – The screens shown are examples. The version numbers and the screen items and selections shown are subject to change over the life of the product.

2.3.4.1 BIOS Main Menu Screen

```
Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************
* System Overview                                ** Use [ENTER], [TAB]     *
* ********************************************** or [SHIFT-TAB] to      *
* AMIBIOS                                        ** select a field.        *
* Version   : 08.00.10                           **                        *
* Build Date: 06/22/05                           ** Use [+] or [-] to      *
* ID        : 0ABGA018                           ** configure system Time. *
*                                                **                        *
* Product Name          : Sun Fire X4200      **                      *
* System Serial Number   : 0525AMF002         **                      *
* BMC Firmware Revision : 1.00                   **                        *
*                                                **                        *
* Processor                                      **                        *
* Type      : AMD Opteron(tm) Processor 254      ** **    Select Screen    *
* Speed     : 2.8 GHz                            ** **    Select Item      *
* Count     : 2                                  ** +-    Change Field     *
*                                                ** Tab   Select Field     *
* System Memory                                  ** F1    General Help     *
* Size      : 3.0 GB                             ** F10   Save and Exit    *
*                                                ** ESC   Exit             *
* System Time                 [14:23:56]         ** ESC   Exit             *
* System Date                 [Wed 07/20/2005]   **                        *
*************************************************************************S
```

2.3.4.2 BIOS Advanced Menu Main Screen

```
Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************
* Advanced Settings                              * Options for CPU        *
* ********************************************** *                        *
* WARNING: Setting wrong values in below sections     *                        *
*          may cause system to malfunction.           *                        *
* * CPU Configuration                                 *                        *
* * IDE Configuration                                 *                        *
* * SuperIO Configuration                             *                        *
* * ACPI Configuration                                *                        *
* * Event Log Configuration                          *                        *
* * Hyper Transport Configuration                     *                        *
* * IPMI 2.0 Configuration                           *                        *
* * MPS Configuration                                * **    Select Screen    *
* * AMD PowerNow Configuration                       * **    Select Item      *
* * Remote Access Configuration                      * Enter Go to Sub Screen *
* * USB Configuration                                * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
* *************************************************************************S
```

2.3.4.3 BIOS Advanced Menu CPU Configuration Screen

```
          Advanced
*******************************************************************************
* CPU Configuration                                * This option should     *
* Module Version: 14.05                            * remain disabled for    *
* Physical Count: 2                                * the normal operation.  *
* Logical Count : 2                                * The driver developer   *
* ************************************************ * may enable it for      *
* AMD Opteron(tm) Processor 254                    * testing purpose.       *
* Revision: E4                                     *                        *
* Cache L1: 64KB                                   *                        *
* Cache L2: 1024KB                                 *                        *
* Speed   : 2800MHz                                *                        *
* Current FSB Multiplier: 14x                      *                        *
* Maximum FSB Multiplier: 14x                      *                        *
* Able to Change Freq.  : Yes                      * **    Select Screen    *
* uCode Patch Level     : None Required            * **    Select Item      *
*                                                  * +-    Change Option    *
* GART Error Reporting           [Disabled]        * F1    General Help     *
* MTRR Mapping                   [Continuous]      * F10   Save and Exit    *
* Speculative TLB Reload         [Enabled]         * ESC   Exit             *
*                                                  *                        *
*                                                  *                        *
*******************************************************************************S
```

2.3.4.4 BIOS Advanced Menu IDE Configuration Screen

```
          Advanced
*******************************************************************************
* IDE Configuration                                * DISABLED: disables the *
* ************************************************ * integrated IDE         *
* OnBoard PCI IDE Controller     [Primary]         * Controller.            *
*                                                  * PRIMARY: enables only  *
* * Primary IDE Master              : [ATAPI CDROM]* the Primary IDE        *
* * Primary IDE Slave               : [Not Detected]* Controller.           *
*                                                  * SECONDARY: enables     *
* Hard Disk Write Protect        [Disabled]        * only the Secondary IDE *
* IDE Detect Time Out (Sec)      [5]               * Controller.            *
*                                                  * BOTH: enables both IDE *
*                                                  * Controllers.           *
*                                                  *                        *
*                                                  * **    Select Screen    *
*                                                  * **    Select Item      *
*                                                  * +-    Change Option    *
*                                                  * F1    General Help     *
*                                                  * F10   Save and Exit    *
*                                                  * ESC   Exit             *
*                                                  *                        *
*                                                  *                        *
*******************************************************************************S
```

2.3.4.5 BIOS Advanced Menu SuperIO Chipset Configuration Screen

```
         Advanced
*******************************************************************************
* Configure Smc27X Super IO Chipset                  * Allows BIOS to Select  *
* ********************************************** * Serial Port1 Base      *
* Serial Port1 Address          [3F8/IRQ4]           * Addresses.             *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                        *
*                                                    *                        *
*******************************************************************************S
```

2.3.4.6 BIOS Advanced Menu ACPI Settings Screen

```
         Advanced
*******************************************************************************
* ACPI Settings                                      * Yes / No               *
* ********************************************** * ACPI support for       *
* ACPI Aware O/S                [Yes]                * Operating System.      *
*                                                    *                        *
* * Advanced ACPI Configuration                      * Yes: If OS             *
*                                                    * supports ACPI.         *
*                                                    *                        *
*                                                    * No: If OS              *
*                                                    * does not support       *
*                                                    * ACPI.                  *
*                                                    *                        *
*                                                    *                        *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                        *
*                                                    *                        *
*******************************************************************************S
```

2.3.4.7 BIOS Advanced Menu ACPI Configuration Screen

```
          Advanced
*******************************************************************************
* Advanced ACPI Configuration                          * Enable RSDP pointers   *
* ************************************************** * to 64-bit Fixed System *
* ACPI 2.0 Features              [Yes]                 * Description Tables.    *
* ACPI APIC support              [Enabled]             *                         *
* ACPI SRAT Table                [Enabled]             *                         *
* AMI OEMB table                 [Enabled]             *                         *
* Headless mode                  [Enabled]             *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      * **    Select Screen    *
*                                                      * **    Select Item      *
*                                                      * +-    Change Option    *
*                                                      * F1    General Help     *
*                                                      * F10   Save and Exit    *
*                                                      * ESC   Exit             *
*                                                      *                         *
*                                                      *                         *
*******************************************************************************S
```

2.3.4.8 BIOS Advanced Menu Event Logging Details Screen

```
          Advanced
*******************************************************************************
* Event Logging details                                * View all unread events *
* ************************************************** * on the Event Log.      *
* View Event Log                                       *                         *
* Mark all events as read                              *                         *
* Clear Event Log                                      *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      *                         *
*                                                      * **    Select Screen    *
*                                                      * **    Select Item      *
*                                                      * Enter Go to Sub Screen *
*                                                      * F1    General Help     *
*                                                      * F10   Save and Exit    *
*                                                      * ESC   Exit             *
*                                                      *                         *
*                                                      *                         *
*******************************************************************************S
```

2.3.4.9 BIOS Advanced Menu HyperTransport Configuration Screen

```
          Advanced
*********************************************************************************
* Hyper Transport Configuration                      * The HyperTransport     *
* ************************************************** * link will run at this  *
*                                                    * speed if it is slower  *
* CPU0:CPU1 HT Link Speed        [Auto]              * than or equal to the   *
* CPU0:CPU1 HT Link Width        [Auto]              * system clock and the   *
*                                                    * board is capable.      *
* CPU0:PCI-X0 HT Link Speed      [Auto]              *                         *
* CPU0:PCI-X0 HT Link Width      [Auto]              *                         *
*                                                    *                         *
* CPU0:PCI-X1 HT Link Speed      [Auto]              *                         *
* CPU0:PCI-X1 HT Link Width      [Auto]              *                         *
*                                                    *                         *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                         *
*                                                    *                         *
*********************************************************************************S
```

2.3.4.10 BIOS Advanced Menu IPMI Configuration Screen

```
          Advanced
*********************************************************************************
* IPMI 2.0 Configuration                             * View all events in the *
* ************************************************** * BMC Event Log.         *
* Status Of BMC                   Working            *                         *
* * View BMC System Event Log                        * It will take up to     *
* Reload BMC System Event Log                        * 60 Seconds approx.     *
* Clear BMC System Event Log                         * to read all            *
* * LAN Configuration                                * BMC SEL records.       *
* * PEF Configuration                                *                         *
* BMC Watch Dog Timer Action     [Disabled]          *                         *
*                                                    *                         *
*                                                    *                         *
*                                                    *                         *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * Enter Go to Sub Screen *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                         *
*                                                    *                         *
*********************************************************************************S
```

2.3.4.11 BIOS Advanced Menu IPMI, View BMC Event Log Screen

```
         Advanced
*******************************************************************************
* Total Number Of Entries:         36                * Use +/- to traverse    *
* ************************************************** * the event log.         *
* SEL Entry Number:              [ 1]                *                         *
* SEL Record ID:               0100                  *                         *
* SEL Record Type:             02 (System Event)     *                         *
* Event Timestamp:             1166s from SEL init   *                         *
* Generator ID:                0020                  *                         *
* Event Message Format Ver:    04 (IPMI ver 1.5)     *                         *
* Event Sensor Type:           25 (Entity Presence)  *                         *
* Event Sensor Number:         1F                    *                         *
* Event Dir Type:              08                    *                         *
* Event Data:                  00 FF FF              *                         *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                         *
*                                                    *                         *
*******************************************************************************S
```

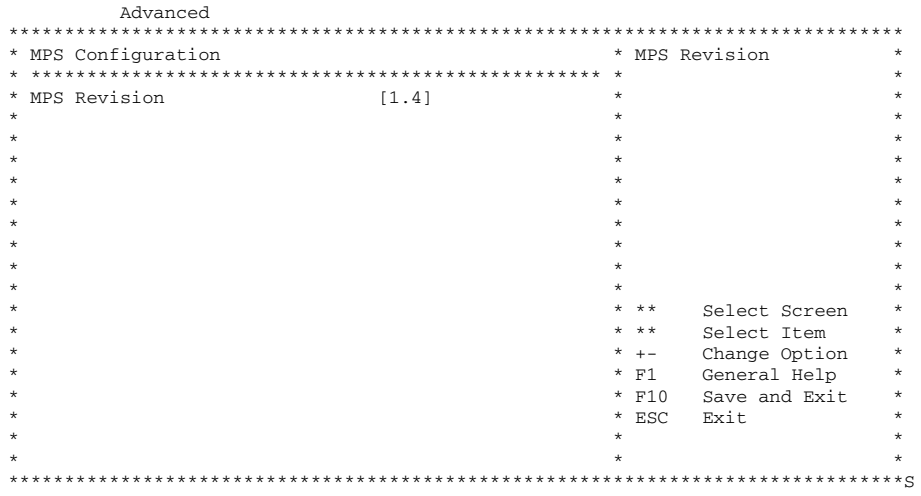
2.3.4.12 BIOS Advanced Menu IPMI, LAN Configuration Screen

```
         Advanced
*******************************************************************************
* LAN Configuration.                                * Enter for IP Address   *
* ************************************************* * Configuration.         *
* Channel Number                [01]                *                         *
* Channel Number Status:        Channel number is OK *                         *
* * IP Address                                      *                         *
* * MAC Address                                     *                         *
* * Subnet Mask                                     *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   * **    Select Screen    *
*                                                   * **    Select Item      *
*                                                   * Enter Go to Sub Screen *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************S
```

2.3.4.13 BIOS Advanced Menu IPMI, PEF Configuration Screen

```
         Advanced
*******************************************************************************
* Set PEF Configuration Parameters Command.         * Enable or Disable PEF  *
* ************************************************* * Support.               *
* PEF SUPPORT                   [Enabled]           * Refer Table 24.6 of    *
* * PEF Action Global Control                       * IPMI Specification 1.5 *
* Alert Startup Delay           [Disabled]          *                         *
* Startup Delay                 [Disabled]          *                         *
* Event Message For PEF Action  [Disabled]          *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   * **    Select Screen    *
*                                                   * **    Select Item      *
*                                                   * +-    Change Option    *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************S
```

2.3.4.14 BIOS Advanced Menu MPS Configuration Screen



2.3.4.15 BIOS Advanced Menu, AMD PowerNow Configuration

Note – The AMD PowerNow! feature is disabled by default on Sun Fire X4100 and Sun Fire X4200 servers. Some problems have been observed when using this feature on certain operating systems. If you want to enable this feature, first check the *Sun Fire X4100 and Sun Fire X4200 Servers Product Notes* (819-1162) for any currently known issues for your operating system.

```
         Advanced
*********************************************************************************
* AMD PowerNow Configuration                        * Enabled/Disabled       *
* ************************************************* * PowerNow               *
* PowerNow                        [Disabled]        *                        *
*                                                   *                        *
*                                                   *                        *
*                                                   *                        *
*                                                   *                        *
*                                                   *                        *
*                                                   *                        *
*                                                   *                        *
*                                                   *                        *
*                                                   *                        *
*                                                   * **    Select Screen    *
*                                                   * **    Select Item      *
*                                                   * +-    Change Option    *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                        *
*                                                   *                        *
*********************************************************************************S
```

2.3.4.16 BIOS Advanced Menu Remote Access Configuration Screen

```
          Advanced
*********************************************************************************
* Configure Remote Access type and parameters       * Select Remote Access   *
* ************************************************* * type.                  *
* Remote Access                   [Enabled]         *                        *
*                                                   *                        *
* Serial port number              [COM1]            *                        *
*      Base Address, IRQ          [3F8h, 4]         *                        *
* Serial Port Mode                [09600 8,n,1]     *                        *
* Flow Control                    [None]            *                        *
* Redirection After BIOS POST     [Always]          *                        *
* Terminal Type                   [ANSI]            *                        *
* VT-UTF8 Combo Key Support       [Enabled]         *                        *
* Sredir Memory Display Delay     [No Delay]        *                        *
*                                                   * **    Select Screen    *
*                                                   * **    Select Item      *
*                                                   * +-    Change Option    *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                        *
*                                                   *                        *
*********************************************************************************S
```

2.3.4.17 BIOS Advanced Menu USB Configuration Screen

```
          Advanced
*******************************************************************************
* USB Configuration                                 * Enables support for     *
* ************************************************* * legacy USB. AUTO        *
* Module Version - 2.23.0-7.4                       * option disables         *
*                                                   * legacy support if       *
* USB Devices Enabled :                             * no USB devices are      *
*   1 Keyboard, 1 Mouse, 1 Hub, 2 Drives            * connected.              *
*                                                   *                         *
* Legacy USB Support             [Enabled]          *                         *
* Hotplug USB FDD Support        [Auto]             *                         *
* Hotplug USB CDROM Support      [Auto]             *                         *
*                                                   *                         *
* * USB Mass Storage Device Configuration           *                         *
*                                                   * **    Select Screen     *
*                                                   * **    Select Item       *
*                                                   * +-    Change Option     *
*                                                   * F1    General Help      *
*                                                   * F10   Save and Exit     *
*                                                   * ESC   Exit              *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************S
```

2.3.4.18 BIOS PCI/PnP Menu

```
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************************
* Advanced PCI/PnP Settings                          ** NO: lets the BIOS      *
* ************************************************** configure all the      *
* WARNING: Setting wrong values in below sections    ** devices in the system. *
*          may cause system to malfunction.          ** YES: lets the         *
*                                                    ** operating system      *
* Plug & Play O/S                [No]                ** configure Plug and     *
* PCI Latency Timer              [64]                ** Play (PnP) devices not *
* Allocate IRQ to PCI VGA        [Yes]               ** required for boot if   *
* Palette Snooping               [Disabled]          ** your system has a Plug *
* PCI IDE BusMaster              [Disabled]          ** and Play operating     *
* OffBoard PCI/ISA IDE Card      [Auto]              ** system.                *
* Onboard LSI SAS/SATA           [Enabled]           **                        *
* Onboard PCI NIC                [Enabled]           ** **    Select Screen    *
* PCIX SLOT1                     [Enabled]           ** **    Select Item      *
* PCIX SLOT2                     [Enabled]           ** +-    Change Option    *
* PCIX SLOT3                     [Enabled]           ** F1    General Help     *
* PCIX SLOT4                     [Enabled]           ** F10   Save and Exit    *
* PCIX SLOT5                     [Enabled]           ** ESC   Exit             *
* Onboard PCI NIC MAC Address                        **                        *
*   GE NIC 1 : 00 03 BA CD 51 39                     **                        *
*   GE NIC 2 : 00 03 BA CD 51 38                     ** Available: Specified   *
*   GE NIC 3 : 00 03 BA CD 51 3B                     ** DMA is available to be *
*   GE NIC 3 : 00 03 BA CD 51 3B                     ** used by PCI/PnP        *
*                                                    ** devices.               *
* IRQ3                           [Available]         ** Reserved: Specified    *
* IRQ4                           [Reserved]          ** DMA is reserved for    *
* IRQ5                           [Available]         ** use by legacy ISA      *
* IRQ7                           [Available]         ** devices.               *
* IRQ9                           [Available]         **                        *
* IRQ10                          [Available]         **                        *
* IRQ11                          [Available]         **                        *
* IRQ14                          [Available]         **                        *
* IRQ15                          [Available]         ** **    Select Screen    *
*                                                    ** **    Select Item      *
* DMA Channel 0                  [Available]         ** +-    Change Option    *
* DMA Channel 1                  [Available]         ** F1    General Help     *
* DMA Channel 3                  [Available]         ** F10   Save and Exit    *
* DMA Channel 5                  [Available]         ** ESC   Exit             *
* DMA Channel 6                  [Available]         **                        *
* DMA Channel 7                  [Available]         **                        *
*                                                    **                        *
* Reserved Memory Size           [Disabled]          **                        *
*************************************************************************************
```

2.3.4.19 BIOS Boot Menu Main Screen

```
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*********************************************************************************
* Boot Settings                                    * Configure Settings     *
* ************************************************ * during System Boot.     *
* * Boot Settings Configuration                    *                          *
*                                                  *                          *
* * Boot Device Priority                           *                          *
* * Hard Disk Drives                               *                          *
* * Removable Drives                               *                          *
* * CD/DVD Drives                          *       *                      *
*                                                  *                          *
*                                                  *                          *
*                                                  *                          *
*                                                  *                          *
*                                                  * **    Select Screen     *
*                                                  * **    Select Item       *
*                                                  * Enter Go to Sub Screen  *
*                                                  * F1    General Help      *
*                                                  * F10   Save and Exit     *
*                                                  * ESC   Exit              *
*                                                  *                          *
*                                                  *                          *
*********************************************************************************S
```

2.3.4.20 BIOS Boot Menu Boot Settings Configuration Screen

```
                              Boot
*********************************************************************************
* Boot Settings Configuration                      * Allows BIOS to skip     *
* ************************************************ * certain tests while     *
* Quick Boot                    [Disabled]         * booting. This will      *
* System Configuration Display  [Disabled]         * decrease the time       *
* Quiet Boot                    [Disabled]         * needed to boot the      *
* Language                      [English]          * system.                 *
* AddOn ROM Display Mode        [Force BIOS]       *                          *
* Bootup Num-Lock               [On]               *                          *
* Wait For 'F1' If Error        [Disabled]         *                          *
* Interrupt 19 Capture          [Disabled]         *                          *
* Default Boot Order            [CRHB]             *                          *
*                                                  *                          *
*                                                  * **    Select Screen     *
*                                                  * **    Select Item       *
*                                                  * +-    Change Option     *
*                                                  * F1    General Help      *
*                                                  * F10   Save and Exit     *
*                                                  * ESC   Exit              *
*                                                  *                          *
*                                                  *                          *
*********************************************************************************S
```

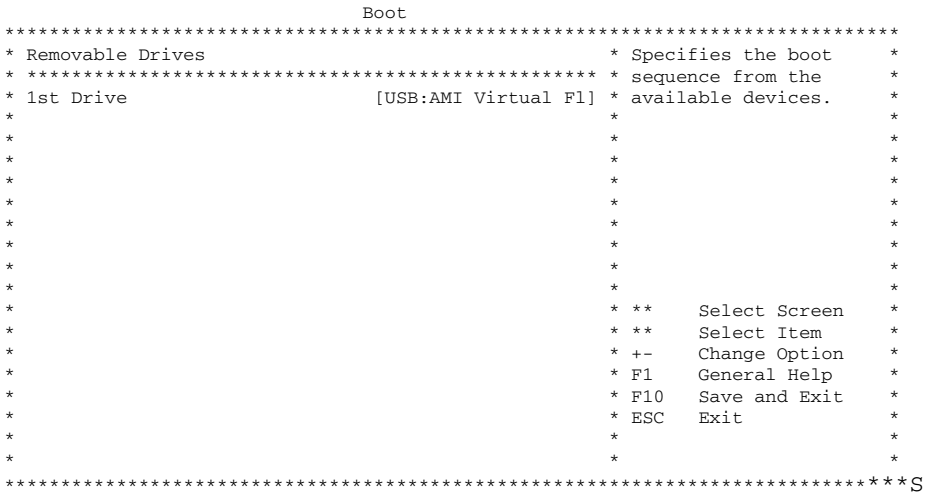
2.3.4.21 BIOS Boot Menu Boot Device Priority Screen

```
                              Boot
*******************************************************************************
* Boot Device Priority                              * Specifies the boot      *
* ************************************************* * sequence from the       *
*                                                   * available devices.      *
* 1st Boot Device                [CD/DVD Drives]    *                         *
* 2nd Boot Device                [Removable Dev.]   * A device enclosed in    *
* 3rd Boot Device                [Hard Drive]       * parenthesis has been    *
* 4th Boot Device                [IBA GE Slot 0108 v] * disabled in the       *
* 5th Boot Device                [IBA GE Slot 0109 v] * corresponding type    *
* 6th Boot Device                [IBA GE Slot 0110 v] * menu.                 *
* 7th Boot Device                [IBA GE Slot 0111 v] *                       *
*                                                   *                         *
*                                                   *                         *
*                                                   * **    Select Screen     *
*                                                   * **    Select Item       *
*                                                   * +-    Change Option     *
*                                                   * F1    General Help      *
*                                                   * F10   Save and Exit     *
*                                                   * ESC   Exit              *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************S
```

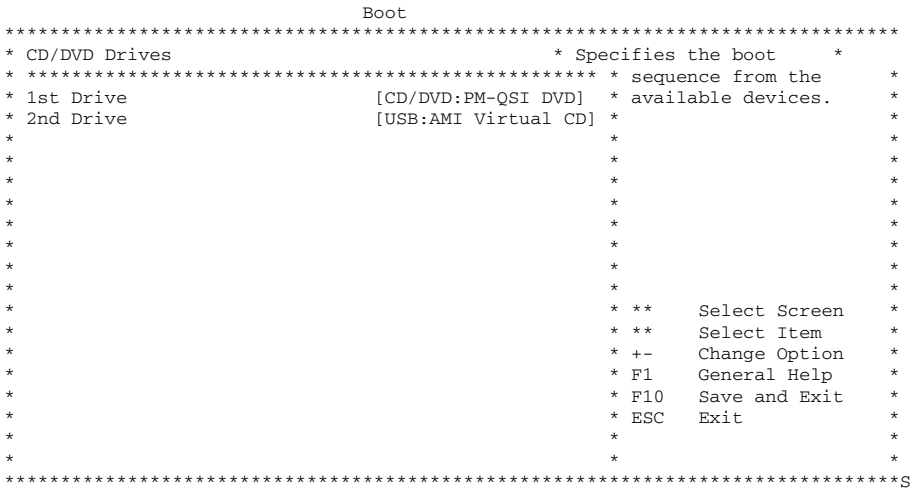
2.3.4.22 BIOS Boot Menu Hard Disk Drives Screen

```
                              Boot
*******************************************************************************
* Hard Disk Drives                                  * Specifies the boot      *
* ************************************************* * sequence from the       *
* 1st Drive                      [#218 ID00 LUN0 FUJ] * available devices.     *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   * **    Select Screen     *
*                                                   * **    Select Item       *
*                                                   * +-    Change Option     *
*                                                   * F1    General Help      *
*                                                   * F10   Save and Exit     *
*                                                   * ESC   Exit              *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************S
```

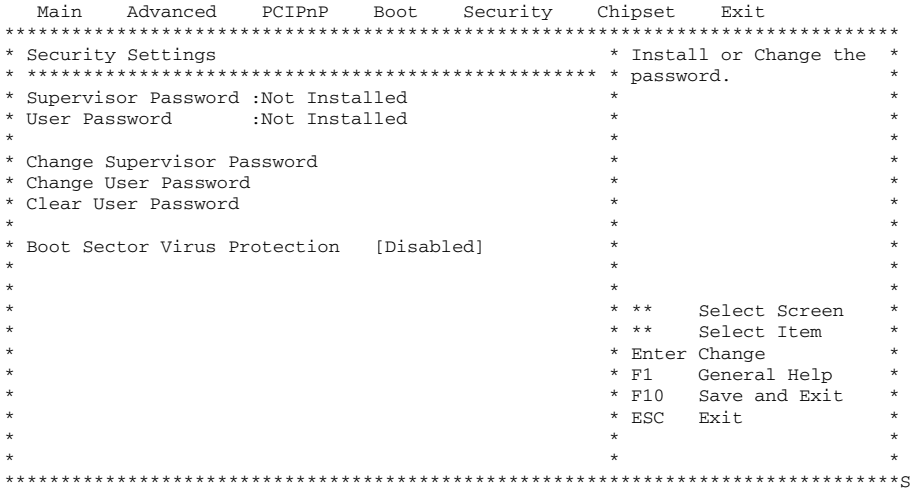
2.3.4.23 BIOS Boot Menu Removable Drives Screen



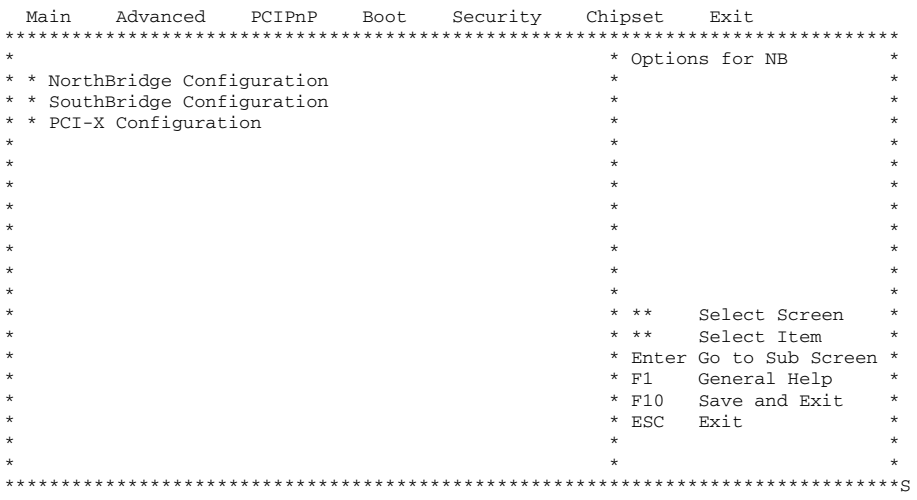
2.3.4.24 BIOS Boot Menu CD/DVD Drives Screen



2.3.4.25 BIOS Security Settings Menu



2.3.4.26 BIOS Chipset Menu Main Screen



2.3.4.27 BIOS Chipset Menu NorthBridge Configuration Screen

```
                                                    Chipset
*******************************************************************************
* NorthBridge Chipset Configuration                 *                         *
* ************************************************* *                         *
* * Memory Configuration                            *                         *
* * ECC Configuration                               *                         *
* * IOMMU Option Menu                               *                         *
* Power Down Control             [Auto]             *                         *
* ************************************************* *                         *
* Memory Timing Parameters       [CPU Node 0]       *                         *
*   Memory CLK             :200 MHz                 *                         *
*   CAS Latency(Tcl)       :3.0                     *                         *
*   RAS/CAS Delay(Trcd)    :3 CLK                   *                         *
*   Min Active RAS(Tras)   :8 CLK                   *                         *
*   Row Precharge Time(Trp):3 CLK                   * **    Select Screen    *
*   RAS/RAS Delay(Trrd)    :2 CLK                   * **    Select Item      *
*   Row Cycle (Trc)        :11 CLK                  * Enter Go to Sub Screen *
*   Row Refresh Cycle(Trfc):14 CLK                  * F1    General Help     *
*   Read Write Delay(Trwt) :4 CLK                   * F10   Save and Exit    *
*   Read Preamble          :7.0 ns                  * ESC   Exit             *
*   Asynchronous Latency   :8 ns                    *                         *
*                                                   *                         *
*******************************************************************************S
```

2.3.4.28 BIOS Chipset Menu NorthBridge Memory Configuration Screen

```
                                                    Chipset
*******************************************************************************
* Memory Configuration                              * MEMCLK can be set      *
* ************************************************* * by the code using      *
* Memclock Mode                  [Auto]             * AUTO, or if you use    *
* MCT Timing Mode                [Auto]             * LIMIT, you can set     *
* User Config Mode               [Auto]             * one of the standard    *
* Bank Interleaving              [Auto]             * values.                *
* Burst Length                   [4 Beats]          *                         *
* Enable Clock to All DIMMs      [Disabled]         *                         *
* SoftWare Memory Hole           [Disabled]         *                         *
* HardWare Memory Hole           [Disabled]         *                         *
* Node Interleaving              [Disabled]         *                         *
*                                                   *                         *
*                                                   * **    Select Screen    *
*                                                   * **    Select Item      *
*                                                   * +-    Change Option    *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************S
```

2.3.4.29 BIOS Chipset Menu NorthBridge ECC Configuration Screen

```
                                                Chipset
*******************************************************************************
* ECC Configuration                                * DRAM ECC allows          *
* ************************************************ * hardware to report       *
* DRAM ECC Enable                [Enabled]         * and correct memory       *
*   MCA DRAM ECC Logging         [Enabled]         * errors automatically     *
*   ECC Chip Kill                [Enabled]         * maintaining system       *
*   DRAM SCRUB REDIRECT          [Disabled]        * integrity.                *
*   DRAM BG Scrub                [Disabled]        *                           *
* L2 Cache BG Scrub              [Disabled]        *                           *
* Data Cache BG Scrub            [Disabled]        *                           *
*                                                  *                           *
*                                                  *                           *
*                                                  *                           *
*                                                  * **    Select Screen      *
*                                                  * **    Select Item        *
*                                                  * +-    Change Option      *
*                                                  * F1    General Help       *
*                                                  * F10   Save and Exit      *
*                                                  * ESC   Exit               *
*                                                  *                           *
*                                                  *                           *
*******************************************************************************S
```

2.3.4.30 BIOS Chipset Menu NorthBridge IOMMU Mode Screen

```
                                                Chipset
*******************************************************************************
* IOMMU Mode                     [AGP Present]     * Set GART size in         *
*                                                  * systems without AGP,     *
*                                                  * or disable altogether.   *
*                                                  * Some OSes require        *
*                                                  * valid GART for proper    *
*                                                  * operation.  If AGP is    *
*                                                  * present, select          *
*                                                  * appropriate option to    *
*                                                  * ensure proper AGP        *
*                                                  * operation.               *
*                                                  *                           *
*                                                  *                           *
*                                                  * **    Select Screen      *
*                                                  * **    Select Item        *
*                                                  * +-    Change Option      *
*                                                  * F1    General Help       *
*                                                  * F10   Save and Exit      *
*                                                  * ESC   Exit               *
*                                                  *                           *
*                                                  *                           *
*******************************************************************************S
```

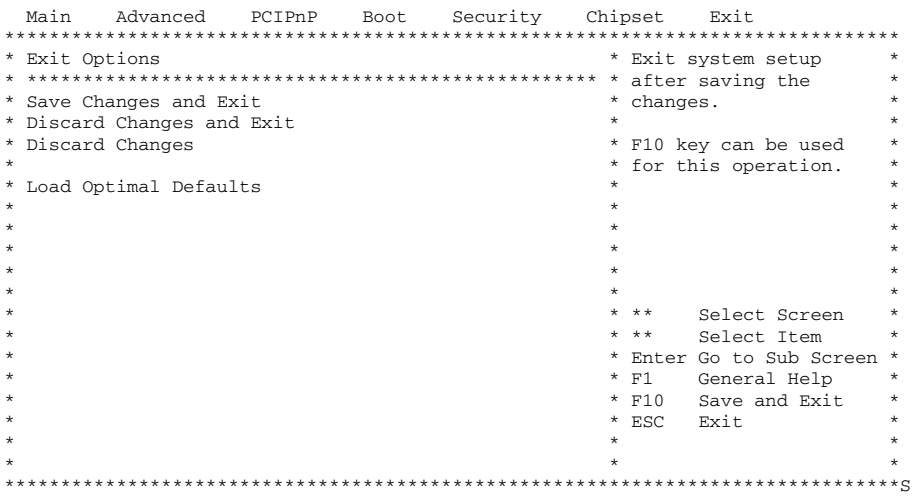
2.3.4.31 BIOS Chipset Menu SouthBridge Configuration Screen

```
                                                Chipset
*******************************************************************************
* South Bridge Chipset Configuration                * Enable/disable         *
* ********************************************** * SMBUS 2.0 Controller   *
* 2.0 SM Bus Controller          [Enabled]          * in South Bridge        *
* Restore on AC/Power Loss       [Power Off]        *                         *
* Power Button Behavior          [Instant Off]      *                         *
*                                                   *                         *
* HT Link 0 P-Comp Mode          [Auto]             *                         *
* HT Link 0 N-Comp Mode          [Auto]             *                         *
* HT Link 0 RZ-Comp Mode         [Auto]             *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   * **    Select Screen    *
*                                                   * **    Select Item      *
*                                                   * +-    Change Option    *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************S
```

2.3.4.32 BIOS Chipset Menu PCI-X Configuration Screen

```
                                                Chipset
*******************************************************************************
* PCI-X Chipset Configuration                       * PCI clock is disabled/ *
* ********************************************** * enabled for 8131       *
* Errata 56 PCLK                 [Enabled]          * Errata 56 if a PCI     *
* HT Link 0 P-Comp Mode          [Auto]             * card behind 8131       *
* HT Link 0 N-Comp Mode          [Auto]             * bridge has more than   *
* HT Link 0 RZ-Comp Mode         [Auto]             * 4 functions and bus    *
* HT Link 1 P-Comp Mode          [Auto]             * speed is 133 MHz.      *
* HT Link 1 N-Comp Mode          [Auto]             *                         *
* HT Link 1 RZ-Comp Mode         [Auto]             *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   * **    Select Screen    *
*                                                   * **    Select Item      *
*                                                   * +-    Change Option    *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************S
```

2.3.4.33 BIOS Exit Option Menu Screen


Main Advanced PCIPnP Boot Security Chipset Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
** Select Screen
** Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit

2.4 Resetting SP and BIOS Passwords Using Jumper P4

This procedure describes how to reset the Administration password (the root password) for the ILOM Service Processor back to the default after it has been set once during initial setup.

Note – This procedure simultaneously removes any BIOS password that was set.

---

1. **Shut down the server to standby power mode by using a ballpoint pen or other stylus to press and release the recessed Power button on the front panel.**

   See Section 2.2, "Powering Off the Server" on page 2-3.

2. **Disconnect the AC power cords from the server.**

Caution – Before handling components, attach an ESD wrist strap to the grounding post that is built into the rear of the chassis (see FIGURE 1-2 or FIGURE 1-5 for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

---

3. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the motherboard, remove the server from the rack.**

4. **Remove the main cover from the server.**

   See Section 3.2.2, "Removing the Main Cover" on page 3-3 or Section 4.2.2, "Removing the Main Cover" on page 4-3.

5. **Install the shorting jumper across the P4 header pins.**

   See FIGURE 2-4 for the P4 jumper location. The P4 jumper's function is to clear the ILOM SP password.

6. **Reinstall the main cover to the server.**

7. **Reconnect AC power cords to the server.**

   The server powers up to standby power mode, indicated when the Power/OK LED on the front panel is flashing.

8. **Return the server to main power mode by using a ballpoint pen or other stylus to press and release the recessed Power button on the front panel.**

Note – You must allow the entire server, not just the SP, to reboot to main power mode to complete the password reset. This is because the state of the P4 jumper cannot be determined without the host CPU running. Wait until the end of POST, when you see the `CMOS password cleared by jumper` message, after which both the BIOS and SP passwords are reset.

- The ILOM SP password is reset to the default, `changeme`.
- The BIOS password is also reset by a separate operation performed by the BIOS when it discovers the presence of the P4 jumper. The BIOS password is not reset to `changeme`, it is removed so that there is no longer a BIOS password set. If you had a BIOS password set, you are no longer prompted for one.

9. **Log in to the ILOM web GUI using `root` as the user name and `changeme` as the password.**

   Refer to the *Integrated Lights Out Manager Administration Guide*, 819-1160.

10. **Change the default password to a password of your choice.**

11. **Repeat steps 1 through 8 to remove the P4 jumper. (Remove the jumper in step 5 rather than inserting it.)**

Note – If you do not remove the P4 jumper, the ILOM SP and BIOS passwords will be reset every time you power-cycle the server.

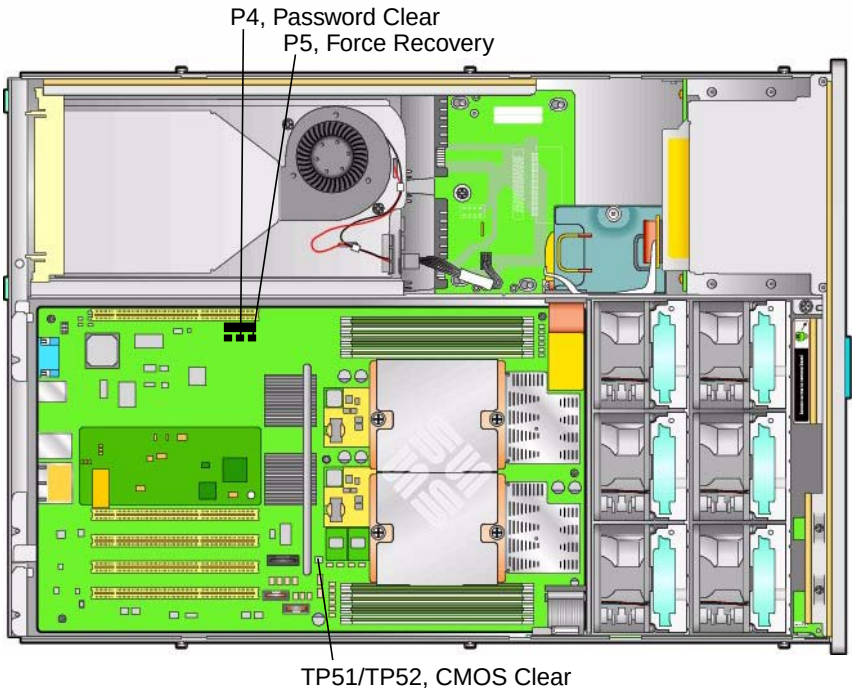


FIGURE 2-4 Location of Jumpers on the Motherboard (Sun Fire X4200 Server Shown)

2.5 Using the Force-Recovery Jumper P5

You can use this jumper to force the server to flash a new BIOS, in the case of a system hang. For example, if the system hangs after an ILOM SP firmware/BIOS update, use this procedure to force the server to look for the new BIOS.

1. **Shut down the server to standby power mode by using a ballpoint pen or other stylus to press and release the recessed Power button on the front panel. See Section 2.2, "Powering Off the Server" on page 2-3.**
2. **Disconnect the AC power cords from the server.**

Caution – Before handling components, attach an ESD wrist strap to the grounding post that is built into the rear of the chassis (see FIGURE 1-2 or FIGURE 1-5 for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

3. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the motherboard, remove the server from the rack.**
4. **Remove the main cover from the server.**

   See Section 3.2.2, "Removing the Main Cover" on page 3-3 or Section 4.2.2, "Removing the Main Cover" on page 4-3.
5. **Install the shorting jumper across the P5 header pins.**

   See FIGURE 2-4 for the P5 jumper location. The P5 jumper's function is to instruct the system to force recovery of the latest BIOS at system reboot.
6. **Reinstall the main cover to the server.**
7. **Reconnect AC power cords to the server.**

   The server powers up to standby power mode, indicated when the Power/OK LED on the front panel is flashing.
8. **Return the server to main power mode by using a ballpoint pen or other stylus to press and release the recessed Power button on the front panel.**

   You must fully power on the server to complete the reset. This is because the state of the P5 jumper cannot be determined without the host CPU running.
9. **Repeat steps 1 through 8 to remove the P5 jumper. (Remove the jumper in step 5 rather than inserting it.)**

Note – If you do not remove the P5 jumper, the server will force a recovery of the new BIOS every time that you power cycle the server.

2.6 Using the Clear CMOS Jumper TP51/TP52

You can use this jumper to clear the server's CMOS settings in the case of a system hang. For example, if the server hangs because of incorrect settings and will not boot, use this jumper to invalidate the settings and reboot with defaults.

1. **Shut down the server to standby power mode by using a ballpoint pen or other stylus to press and release the recessed Power button on the front panel.**

   See Section 2.2, "Powering Off the Server" on page 2-3.

2. **Disconnect the AC power cords from the server.**

Caution – Before handling components, attach an ESD wrist strap to the grounding post that is built into the rear of the chassis (see FIGURE 1-2 or FIGURE 1-5 for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

3. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the motherboard, remove the server from the rack.**

4. **Remove the main cover from the server.**

   See Section 3.2.2, "Removing the Main Cover" on page 3-3 or Section 4.2.2, "Removing the Main Cover" on page 4-3.

5. **Install the shorting jumper across the TP51/TP52 header pins.**

   See FIGURE 2-4 for the TP51/TP52 jumper location.

6. **Wait 10 seconds, then remove the shorting jumper.**

   This jumper removes battery power from the SouthBridge chipset where the CMOS settings are stored, thereby removing the CMOS settings.

7. **Reinstall the main cover to the server.**

8. **Reconnect AC power cords to the server.**

   The server powers up to standby power mode, indicated when the Power/OK LED on the front panel is flashing.

2.7 Using the Reset and NMI Switches

Caution – Do not use the Reset and NMI switches unless you are instructed to do so by authorized Service personnel.

The Reset switch (SW3 on the motherboard) sends a reset order to the CPUs, resetting the main system, but not the service processor. The button for this switch can be pushed by sticking a paper clip or similar object through the hole provided on the rear of the chassis (see FIGURE 2-5, which shows the locations on both the Sun Fire X4100 and Sun Fire X4200 servers).

The Non-Maskable Interrupt (NMI) switch (SW2 on the motherboard) sends an NMI order to the CPUs, which is used by Field Service for debugging activities at the request of Service personnel. The button for this switch can be pushed by sticking a paper clip or similar object through the hole provided on the rear of the chassis (see FIGURE 2-5, which shows the locations on both the Sun Fire X4100 and Sun Fire X4200 servers).

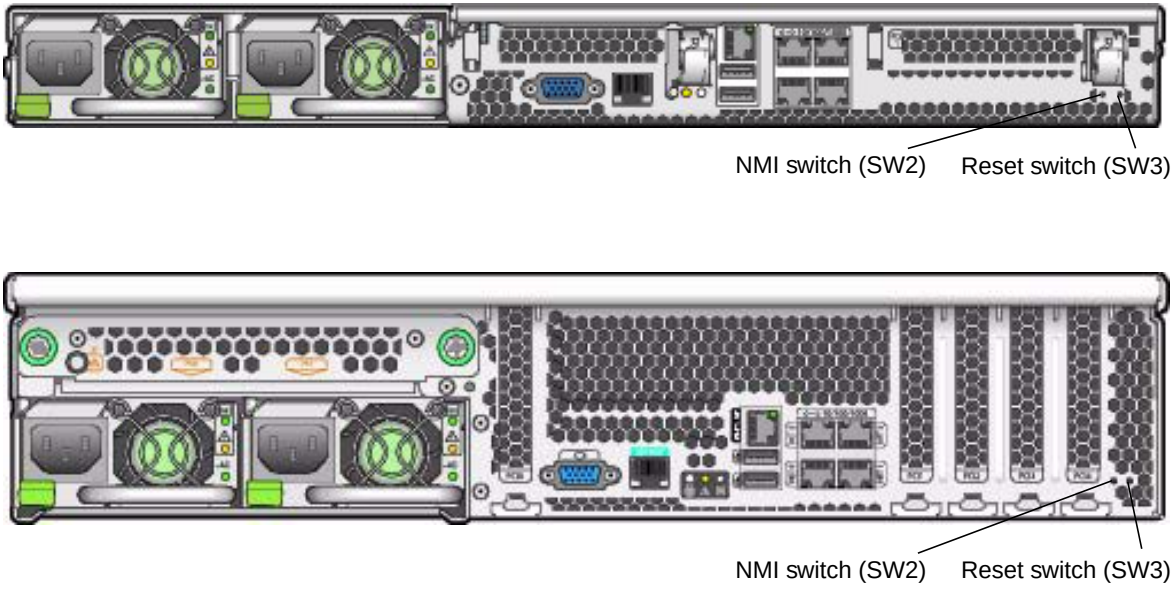


FIGURE 2-5 Sun Fire X4100 and Sun Fire X4200 Servers Back Panels

2.8 Updating the BIOS

The BIOS is updated whenever you update the ILOM Service Processor firmware. For instructions on updating the firmware, refer to the *Integrated Lights-Out Manager Administration Guide*, 819-1160.

2.9 Power-On Self-Test (POST)

For information about BIOS POST testing, POST codes, POST code checkpoints, and console redirection, see Appendix B, "BIOS POST Codes" on page B-1.

CHAPTER 3

Maintaining the Sun Fire X4100 Server

This chapter contains information and procedures for servicing the Sun Fire X4100 server hardware, including component removal and replacement procedures.

3.1 Tools and Supplies Needed

The Sun Fire X4100 server can be serviced with the following items:

- No. 2 Phillips screwdriver
- Antistatic wrist strap
- Ballpoint pen or other pointed object (to press the recessed Power button)
- 8-mm nut-driver (for motherboard replacement)
- Long-nosed pliers (optional for Graphics Redirect and Service Processor (GRASP) board removal)

3.2 Powering Off the Server and Removing the Covers

Use the preparatory procedures in this section when you are referred to them from the removal and replacement procedures.

3.2.1 Powering Off the Server

1. **Choose a method for shutting down the server from main power mode to standby power mode. See** FIGURE 3-1**.**
   - **Graceful shutdown:** Use a ballpoint pen or other stylus to press and release the recessed Power button on the front panel. This causes Advanced Configuration and Power Interface (ACPI) enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems shut down to standby power mode immediately.
   - **Emergency shutdown:** Press and hold the Power button for four seconds to force main power off and enter standby power mode.

   When main power is off, the Power/OK LED on the front panel will begin flashing, indicating that the server is in standby power mode.

Caution – When you use the Power button to enter standby power mode, power is still directed to the GRASP board and power supply fans, indicated when the Power/OK LED is flashing. To completely power off the server, you must disconnect the AC power cords from the back panel of the server.

FIGURE 3-1 Power Button and Power/OK LED Location

2. **Unplug both power cords from the server's power supplies.**
3. **Turn off all peripheral devices connected to the system.**
4. **Label any peripheral cables and/or telecommunication lines that must be disconnected in order to remove and replace a specific component.**

3.2.2 Removing the Main Cover

Caution – Before handling components, attach an electrostatic-discharge (ESD) wrist strap to the grounding post that is built into the rear of the chassis (see FIGURE 1-2 for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

1. **Press down on the cover release button and, using the indent for leverage, slide the main cover toward the rear of the chassis approximately 0.5 inch (12 mm). See** FIGURE 3-2**.**
2. **Grasp the cover by its rear edge and lift it straight up from the chassis.**

Note – When you remove any cover, the intrusion switch that is on the front I/O board automatically powers down the system to standby power mode.

FIGURE 3-2 Removing the Main Cover

3.2.3 Removing the Front Bezel

Remove the bezel from the front of the chassis by following these steps:

1. **Open the fan bay door and use a No. 2 Phillips screwdriver to unfasten the captive screw that locks the bezel in place. See** FIGURE 3-3**.**
2. **Pull the bezel away from the chassis.**

Note – Be careful to avoid bending the bezel by loosening it from the middle and both end sockets simultaneously.

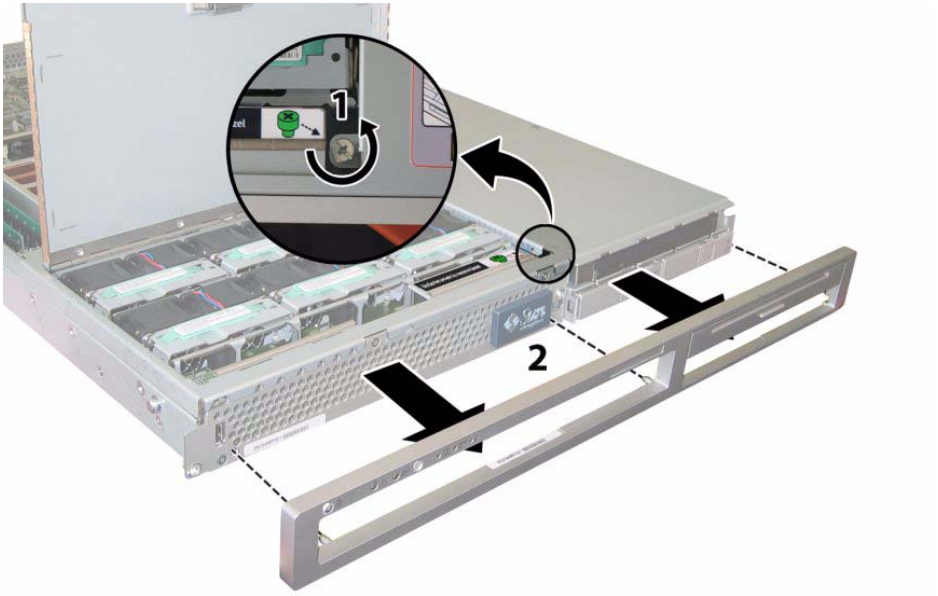


FIGURE 3-3 Unfastening the Front Bezel Locking Screw

3.2.4 Removing the Front Cover

1. **Open the door to the fan bay. See** FIGURE 3-4**.**
2. **While holding the fan bay door open, slide the front cover toward the front of the chassis approximately 0.25 inch (6 mm).**
3. **Raise the rear edge of the cover first and then lift it off of the chassis.**

Note – When you remove any cover, the intrusion switch that is on the front I/O board automatically powers down the system to standby power mode.

Note – When you replace the front cover, place the front edge on the chassis first, then set it down into the keyed slots on the chassis sides before sliding it back.

Note – For Sun Fire X4100 servers with the factory-configured option for four hard disk drives: You must remove the top two hard disk drives before reinstalling the front cover to provide clearance for the front cover to slide on the chassis. Reinstall the top two hard disk drives after you reinstall the front cover.

FIGURE 3-4 Removing the Front Cover

3.3 Locations of the Sun Fire X4100 Components

FIGURE 3-5 shows the locations of the replaceable Sun Fire X4100 components that are documented in this chapter.

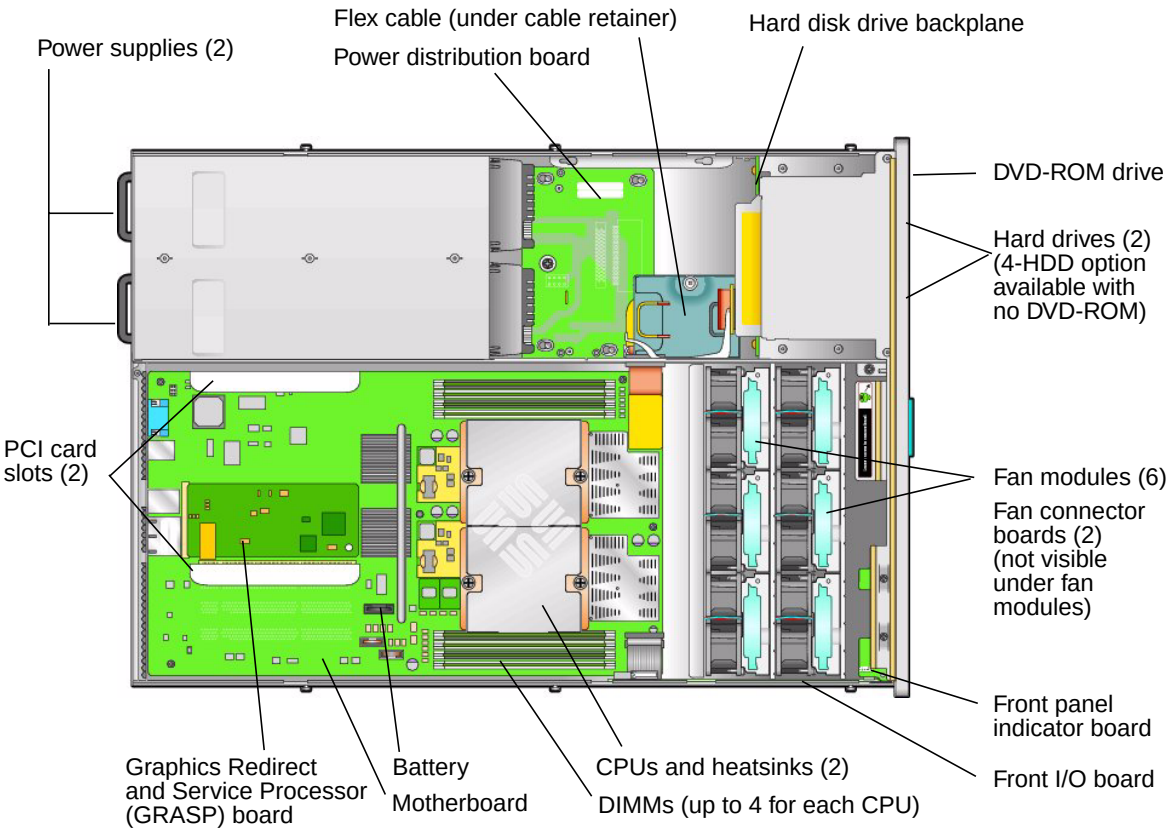


FIGURE 3-5 Sun Fire X4100 Replaceable Component Locations

3.4 Replaceable Component Procedures

Note – Some of the procedures in this section are for customer-replaceable units (CRUs) and some are for field-replaceable units (FRUs), as noted in the procedures and in the list below. FRU components should be replaced *only* by trained service technicians. Contact your Sun Service representative for assistance with FRU replacements.

This section contains procedures for replacing the following components:

- Section 3.4.1, "Replacing the Battery" on page 3-8 (CRU)
- Section 3.4.2, "Replacing a CPU and Heatsink" on page 3-10 (FRU)
- Section 3.4.3, "Replacing the DVD-ROM Drive" on page 3-16 (FRU)
- Section 3.4.4, "Installing a DVD-ROM Drive Upgrade Kit" on page 3-19 (FRU)
- Section 3.4.5, "Replacing a Fan Module" on page 3-24 (CRU)
- Section 3.4.6, "Replacing a Fan Connector Board" on page 3-26 (CRU)
- Section 3.4.7, "Replacing the Front Panel Indicator Board" on page 3-29 (CRU)
- Section 3.4.8, "Replacing the Front I/O Board" on page 3-31 (CRU)
- Section 3.4.9, "Replacing the Graphics Redirect and Service Processor (GRASP) Board" on page 3-37 (FRU)
- Section 3.4.10, "Replacing a Hard Disk Drive" on page 3-39 (CRU)
- Section 3.4.11, "Replacing a Hard Disk Drive Backplane" on page 3-42 (FRU)
- Section 3.4.12, "Replacing Memory Modules (DIMMs)" on page 3-47 (CRU)
- Section 3.4.13, "Replacing the Motherboard" on page 3-51 (FRU)
- Section 3.4.14, "Replacing PCI Cards" on page 3-60 (CRU)
- Section 3.4.15, "Replacing a Power Supply" on page 3-64 (CRU)
- Section 3.4.16, "Replacing the Power Distribution Board" on page 3-66 (FRU)

Caution – Before handling components, attach an ESD wrist strap to the grounding post that is built into the rear of the chassis (see FIGURE 1-2 for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

3.4.1 Replacing the Battery

Follow these steps to remove and replace the system battery.

Note – This component is a CRU and can be replaced by anyone.

TABLE 3-1 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-1 Sun Fire X4100 Supported Battery Part Numbers

Component	Part Number
Battery, system	150-3993

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**

Note – Note the orientation (polarity) of the battery in its holder before it is removed. The positive polarity, marked with a "+" symbol, should be facing toward the chassis center.

---

4. **Remove the battery by gently pulling the clip away from the battery face and lifting the battery straight up. See** FIGURE 3-6**.**

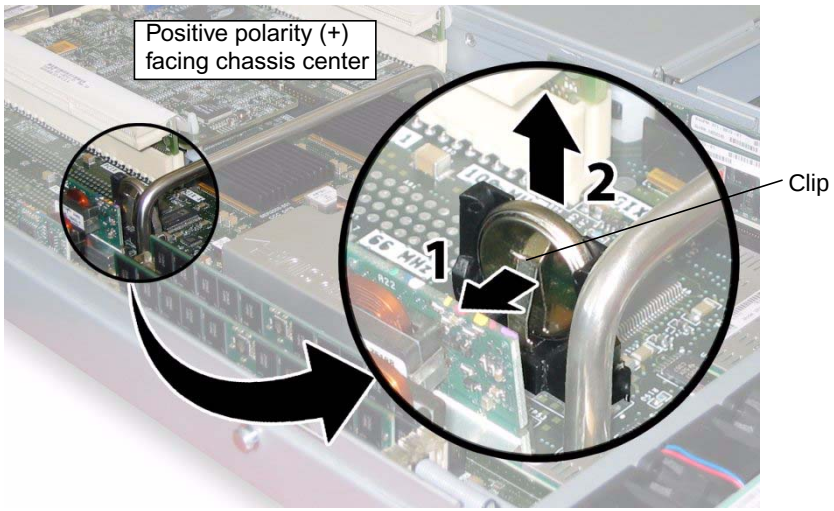


FIGURE 3-6 Removing the Battery

Installation is the reverse of this procedure.

Note – Install the new battery in the holder with the same orientation (polarity) as the battery that you removed. The positive polarity, marked with a "+" symbol, should be facing toward the chassis center.

3.4.2 Replacing a CPU and Heatsink

Follow these steps to remove and replace the a CPU and its heatsink.

Note – This component is a FRU and should be replaced *only* by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 3-2 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-2 Sun Fire X4100 Supported CPU Part Numbers

Component	Part Number
AMD 248 (2.2 GHZ) Opteron single-core CPU	370-7711
AMD 252 (2.6 GHZ) Opteron single-core CPU	370-7272
AMD 254 (2.8 GHZ) Opteron single-core CPU	370-7962
AMD 256 (3.0 GHz) Opteron single-core CPU	371-1776
AMD 270 (2.0 GHZ) Opteron dual-core CPU	370-7799
AMD 275 (2.2 GHZ) Opteron dual-core CPU	370-7800
AMD 280 (2.4 GHz) Opteron dual-core CPU * See the caution after this table.	371-0839
AMD 285 (2.6 GHz) Opteron dual-core CPU * See the caution after this table.	371-0856

Caution – Some AMD CPUs are released as Special Editions, which might differ in wattage from non-Special Edition versions of the CPU. Do not mix Special Edition CPUs with non-Special Edition versions. Always make sure that all CPUs in the server have the same part number.

---

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**

4. **Identify which CPU and heatsink you are replacing.**

   The internal system software designation of the two CPUs in the server is shown in FIGURE 3-7. There is a fault LED on the motherboard for each CPU (see FIGURE 3-8 for the LED location):

   - LED is off: CPU is OK.
   - LED is lit (amber): CPU has encountered a voltage or heat error condition.

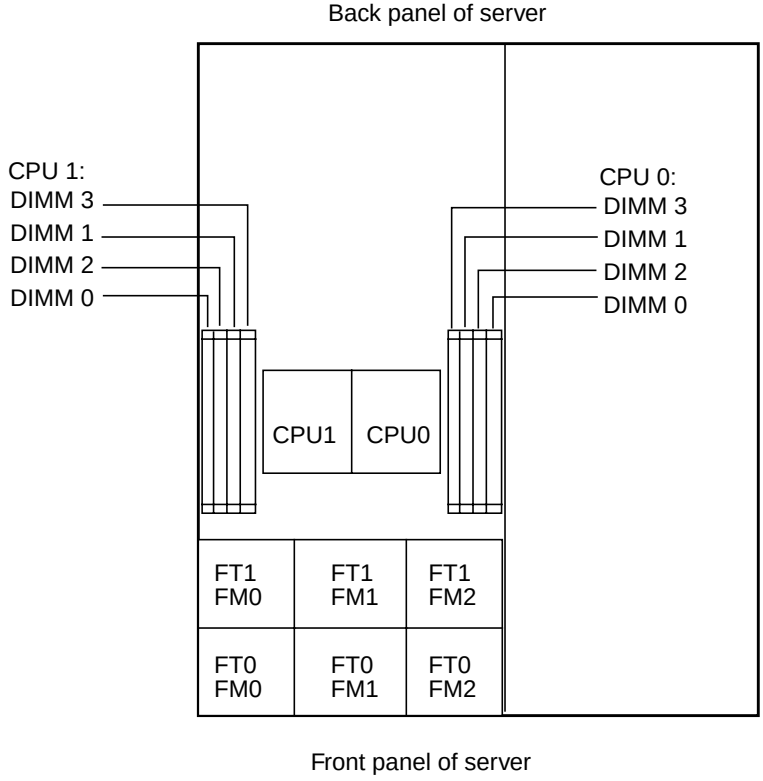


FIGURE 3-7 Sun Fire X4100 Designation of CPUs

5. **Remove the CPU and heatsink from the motherboard:**

   a. **Hold down on the top of the heatsink to prevent it from tipping unevenly while you alternately loosen the two spring-loaded mounting screws that secure the heatsink to the motherboard. Turn the screws 180-degrees at a time, then remove the screws when they are detached. See** FIGURE 3-8 **and** FIGURE 3-9**.**

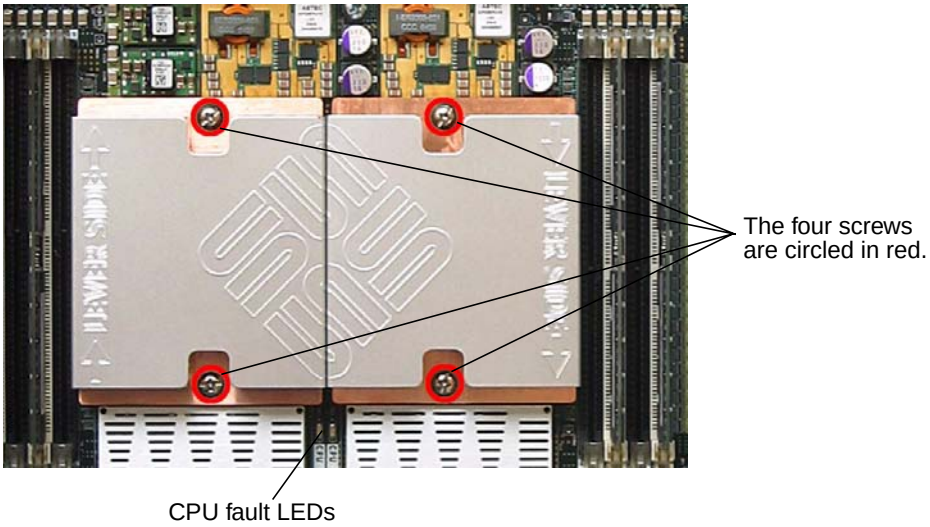


FIGURE 3-8 Location of the Heatsink Screws and CPU Fault LEDs

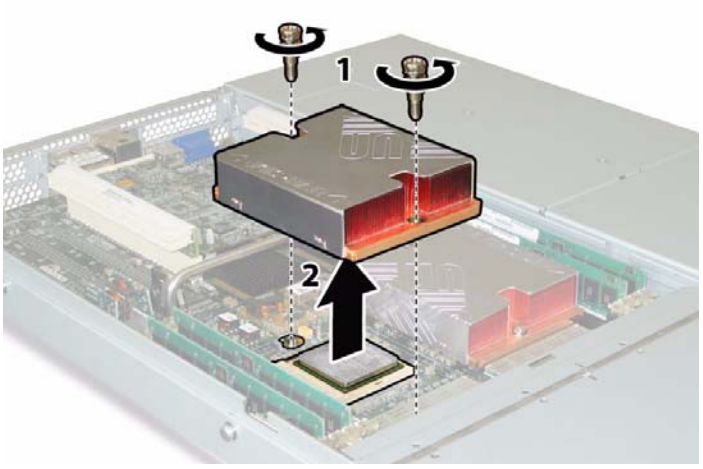


FIGURE 3-9 Removing the Heatsink

b. Twist the heatsink slightly to lift it off of the board. Turn the heatsink upside down and allow the spring in each of the two mounting holes to fall out into your hand.

Note – Set the heatsink upside down on a clean, flat surface to prevent the thermal grease from contaminating other components.

---

c. Pull the CPU socket lever slightly away from the socket. See FIGURE 3-10**.**

d. Pivot the lever up, into the fully open, vertical, position.

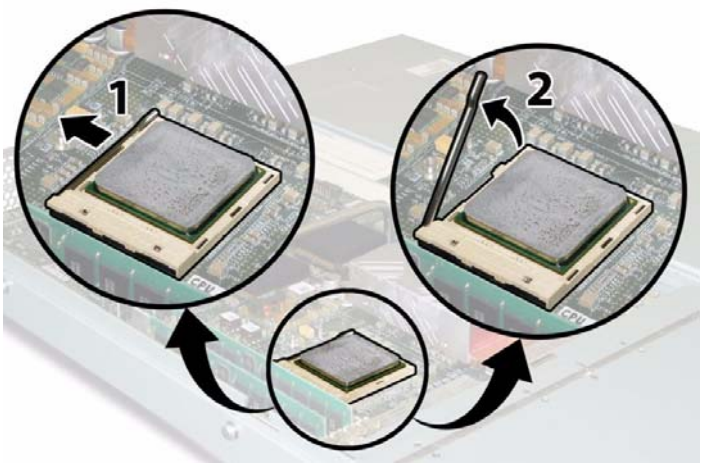


FIGURE 3-10 Releasing the CPU Socket Lever

e. Lift the CPU out of the socket, leaving the lever in the vertical, open position. See FIGURE 3-11**.**

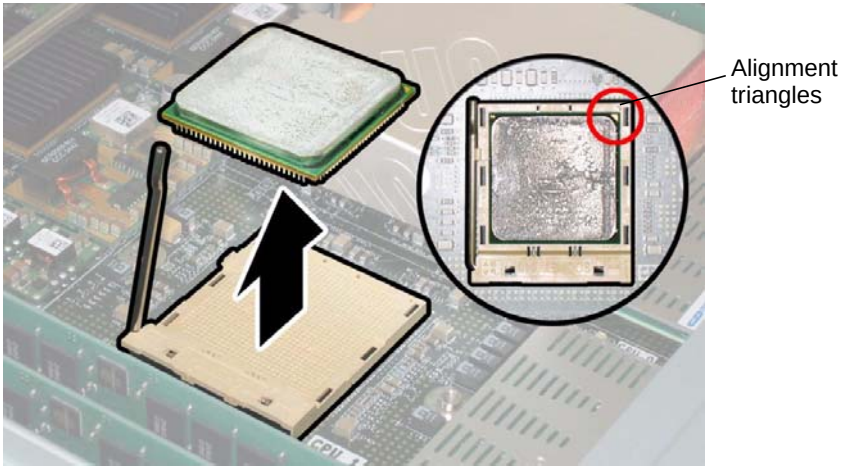


FIGURE 3-11 Removing the CPU From the Socket

6. **Install the new CPU and heatsink:**

Note – Mixing CPU speeds or mixing dual-core CPUs with single-core CPUs is not supported. Use two identical CPUs in your server.

---

a. Unpack the new CPU and heatsink.

b. Ensure that the CPU socket release lever is in the fully open, vertical position.

c. Align the CPU in the socket as shown in FIGURE 3-11**.**

Note – Align the triangle that is printed on one corner of the CPU with the tiny triangle that is imprinted on the CPU socket, as shown in the red circle in FIGURE 3-11.

Caution – The pins on the CPU are very fragile. If the CPU is correctly aligned, it will enter the CPU socket with little or no resistance. If you feel more than minimal resistance, stop and recheck the alignment. Forcing a misaligned CPU into the CPU socket could damage both devices.

---

d. Gently insert the CPU pins into the socket.

e. When the CPU is fully seated in the socket, pivot the release lever down and into the locked position, at the side of the socket.

f. If you are reinstalling an existing CPU or heatsink, use an alcohol pad to clean all old thermal grease from the component surface.

Caution – Ensure that the thermal grease in the syringe supplied with the CPU is pliable and not stiff. If your syringe of grease has aged, the grease might be too stiff to adequately spread out and ensure thermal conductance.

---

g. Use one syringe of thermal grease (one ml) to carefully apply grease to the top of the CPU in three lines in the pattern shown in FIGURE 3-12**.**

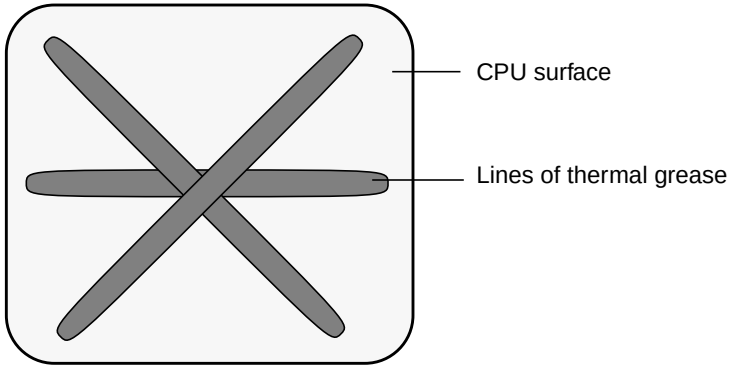


FIGURE 3-12 Required Pattern for Thermal Grease Application

7. **Turn the heatsink upright and reinstall the two springs and mounting bolts.**

Caution – Avoid moving the heatsink after it has contacted the top of the CPU. Too much movement could disturb the layer of thermal grease, leading to component damage.

---

8. **Carefully position and align the heatsink over the CPU.**

Note – The heatsink is not symmetrical and it must be aligned before you place it on the CPU. Turn the heatsink so that the "Lever Side" label and arrows imprinted on the top of the heatsink are pointing to the side of the CPU socket that has the release lever. Also note that the half of the Sun Microsystems logo imprinted on the top of the heatsink will create a complete logo when correctly aligned with the adjacent heatsink. See FIGURE 3-8.

---

9. **Lower the heatsink onto the CPU, aligning the mounting bolts with their holes on the motherboard.**
10. **Alternately tighten the two heatsink mounting screws 180-degrees at a time until each spring is completely compressed.**

3.4.3 Replacing the DVD-ROM Drive

Follow these steps to remove and replace the DVD-ROM drive.

Note – This component is a FRU and should be replaced *only* by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 3-3 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-3 Sun Fire X4100 Supported DVD-ROM Drive Part Numbers

Component	Part Number
Slim-slot DVD-ROM drive (RoHS-compliant, replaces 540-6368)	390-0320

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**
4. **Remove the front bezel as described in Section 3.2.3, "Removing the Front Bezel" on page 3-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 3.2.4, "Removing the Front Cover" on page 3-5.**
6. **Remove the upper cable retainer from the chassis midwall. See** FIGURE 3-13**.**

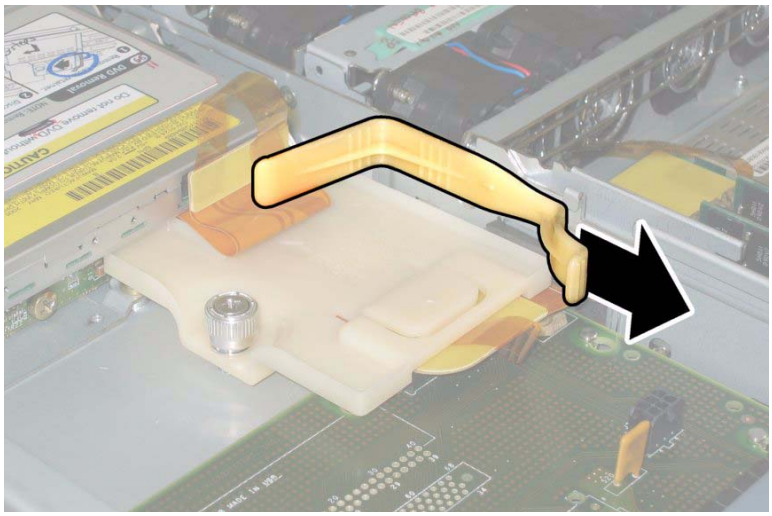


FIGURE 3-13 Removing the Upper Cable Retainer

7. **Disconnect the flex cable connector from the rear of the DVD-ROM drive. See** FIGURE 3-14**.**

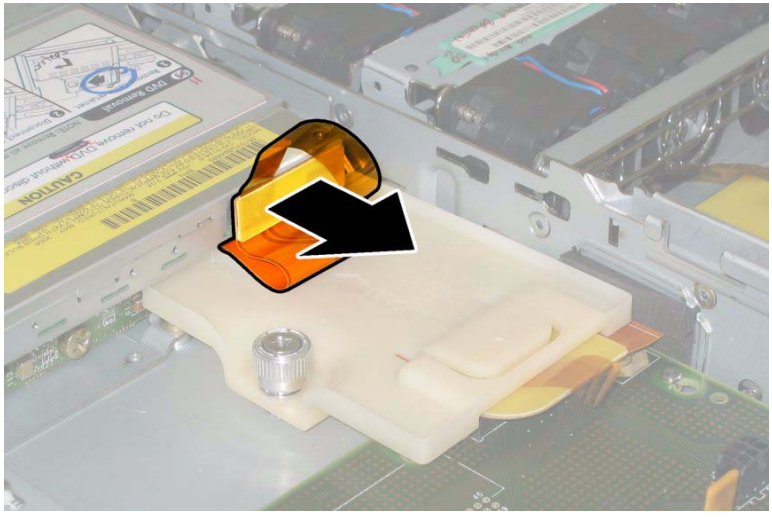


FIGURE 3-14 Releasing the DVD-ROM Drive Flex Cable Connector

8. **Pull the spring latch at the front of the DVD-ROM drive to the left and hold it. Use your other hand to reach behind the drive and push it out through the front of the chassis. See** FIGURE 3-15**.**

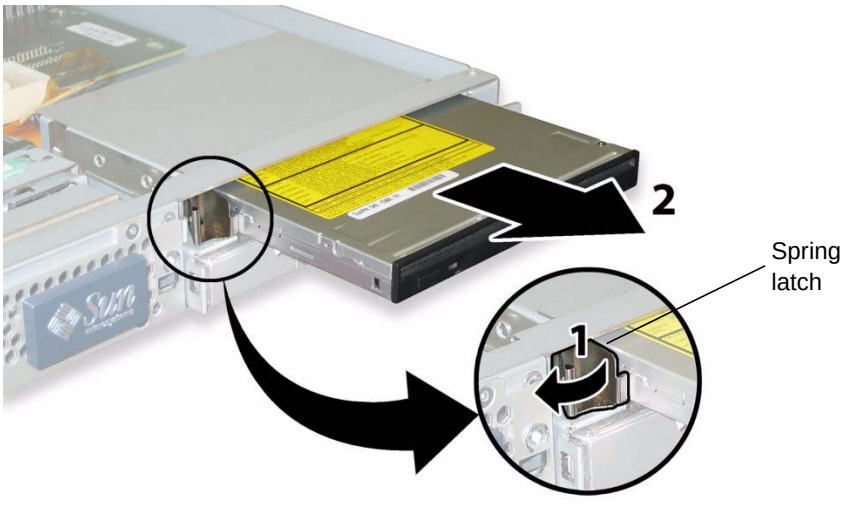


FIGURE 3-15 Removing the DVD-ROM Drive

Installation is the reverse of this procedure.

Note – When you replace the DVD-ROM drive, the flex cable, and its cable retainers, reposition the flex cable to the folded position shown in FIGURE 3-13. Do not pinch the flex cable against the back of the DVD-ROM drive, which might damage the flex cable.

3.4.4 Installing a DVD-ROM Drive Upgrade Kit

- Follow these steps to install a DVD-ROM upgrade kit to a system that previously did not have a DVD-ROM drive.
- If you are removing and replacing an existing DVD-ROM drive, see Section 3.4.3, "Replacing the DVD-ROM Drive" on page 3-16.

Note – This component is a FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 3-3 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-4 Sun Fire X4100 Supported DVD-ROM Upgrade Kit Part Numbers

Component	Part Number
DVD-ROM Upgrade Kit	X8030A-Z

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**
4. **Remove the front bezel as described in Section 3.2.3, "Removing the Front Bezel" on page 3-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 3.2.4, "Removing the Front Cover" on page 3-5.**
6. **Install the DVD-slot faceplate to the front bezel. See** FIGURE 3-16**:**
   a. **Lay the bezel face-down on a work surface.**
   b. **Use a No. 2 Phillips screwdriver to remove the two screws that secure the blank filler panel to the bezel. Save the screws in a safe place because you will reinstall them in a following step.**

c. Remove the blank filler panel and set it aside.

d. Set the new DVD-slot faceplate in place in the bezel opening.

Ensure that the ejector button on the faceplate is oriented toward the bottom of the bezel.

e. Use a No. 2 Phillips screwdriver to reinstall the two screws that secure the faceplate to the bezel.

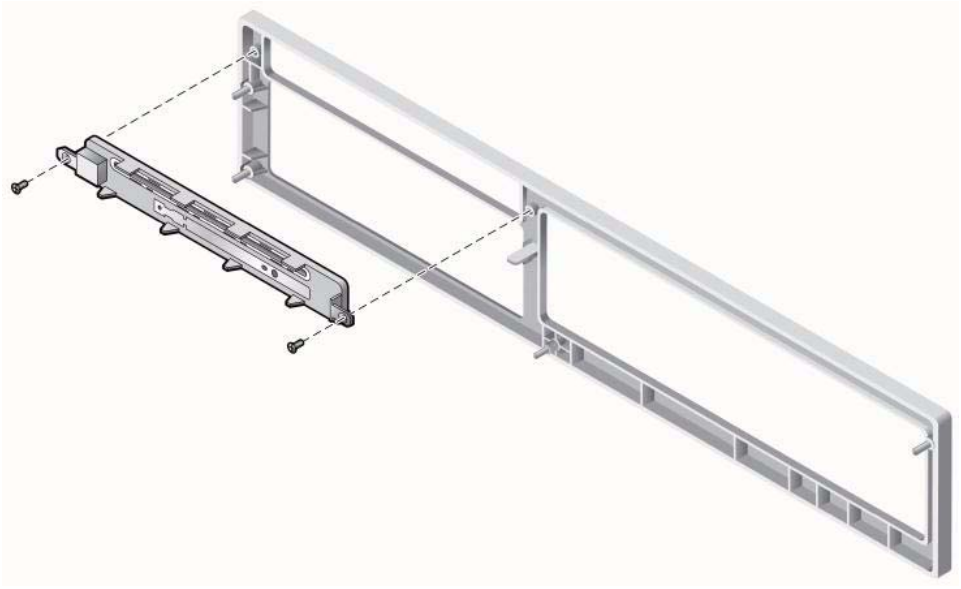


FIGURE 3-16 Installing the DVD-Slot Faceplate to the Front Bezel (Sun Fire X4200 bezel shown)

7. **Install the DVD-ROM drive into the chassis. See** FIGURE 3-17**:**

   a. **Align the rear of the DVD-ROM drive with the opening in the chassis.**

   b. **Push the DVD-ROM drive into the chassis until the spring latch on the chassis closes over the front corner of the drive.**

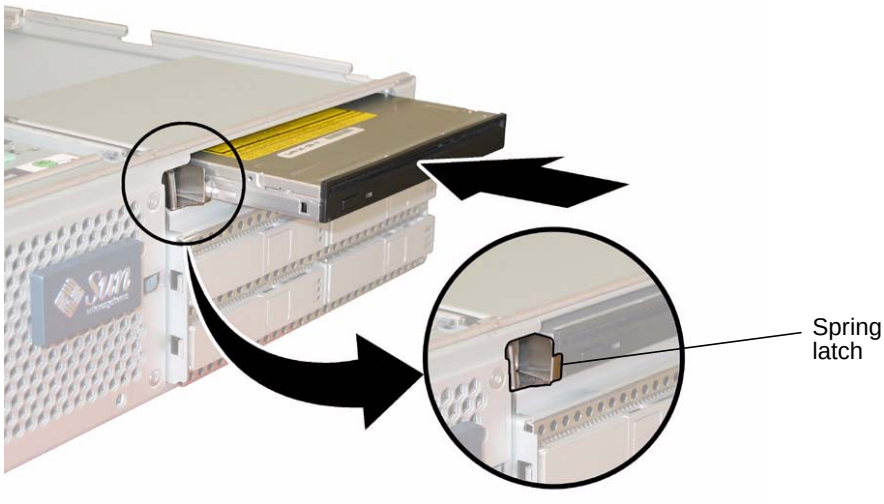


FIGURE 3-17 Installing the DVD-ROM Drive (Sun Fire X4200 server shown)

8. **Connect the unused flex cable connector to the rear of the DVD-ROM drive. See** FIGURE 3-18**.**

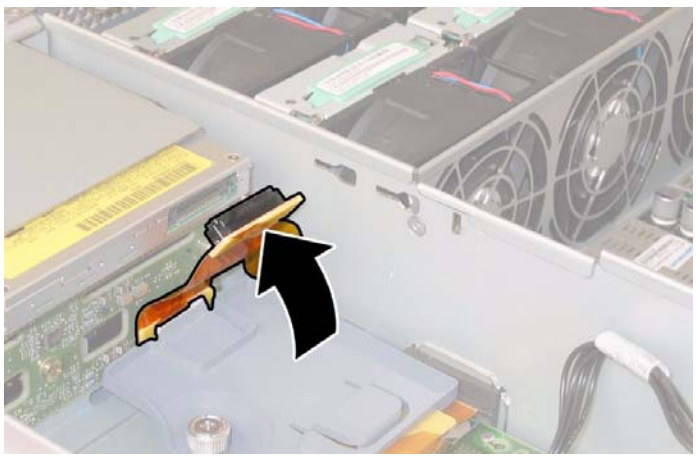


FIGURE 3-18 Connecting the DVD-ROM Drive Flex Cable Connector (Sun Fire X4200 server shown)

9. **Install the upper cable retainer to the chassis midwall. See** FIGURE 3-19**:**

   a. **Insert the two pegs on the cable retainer into the two holes in the chassis midwall.**

   b. **Slide the cable retainer forward until it is locked in place and it is holding the flex cable connector firmly against the rear of the DVD-ROM drive.**

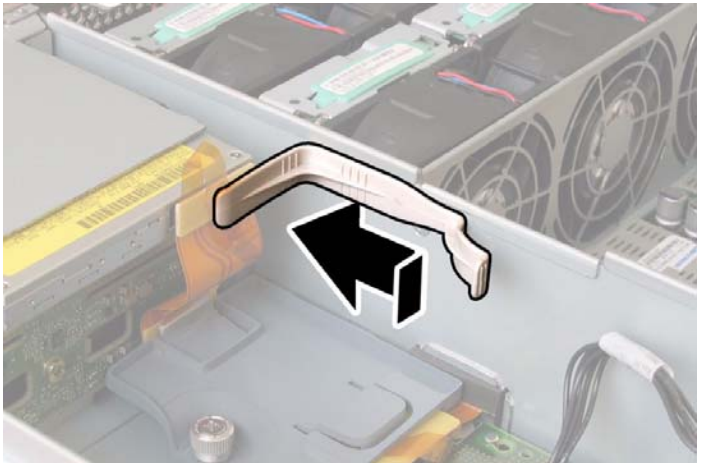


FIGURE 3-19 Installing the Cable Retainer (Sun Fire X4200 server shown)

10. **Replace the front cover to the chassis. See** FIGURE 3-4**.**

    a. **Place the front edge of the cover squarely onto the chassis top-front edge.**

    b. **Set the rear of the cover down so that it fits into the keyed slots on the chassis sides.**

    c. **Slide the cover toward the rear of the chassis to lock it in place.**

Caution – Ensure that the front edge of the cover is seated tightly and squarely against the gasket on the top-front edge of the chassis to avoid overheating the server.

11. **Replace the front bezel to the chassis:**

    a. **Align the pegs on the rear of the bezel with the corresponding holes in the front of the chassis.**

Note – Ensure that the new DVD-slot faceplate is over the DVD-ROM drive and that the button on the DVD-slot faceplate is oriented toward the chassis bottom. See FIGURE 3-1.

---

    b. **Press the bezel evenly against the front of the chassis until it is flat against the front of the chassis.**

    c. **Open the fan bay door on the front cover and tighten the captive retaining screw that secures the bezel in place. See** FIGURE 3-3**.**

12. **Replace the main cover to the chassis:**

    a. **Set the cover in place so that it aligns with the keyed openings in the chassis sides.**

    b. **Slide the cover toward the chassis front until it is firmly and squarely against the edge of the front cover.**

13. **Return power to the server. See** **Section 2.1, "Powering On the Server" on page 2-2.**

3.4.5 Replacing a Fan Module

Follow these steps to remove and replace an individual fan module.

Note – This component is a hot-swappable CRU and can be replaced by anyone.

TABLE 3-5 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-5 Sun Fire X4100 Supported Fan Module Part Numbers

Component	Part Number
Fan tray assembly (Sun Fire X4100 fan module)	541-0266

Caution – The fans are hot-swappable and can be removed and replaced while the system is running. Do not hold the fan bay door open for more than 60 seconds at a time to avoid overheating the server. Remove and replace only one fan at a time.

The internal system software designation of the fan connector boards, or fan trays (FT), and fan modules (FM) is shown in FIGURE 3-20 (viewed from the front of the server).

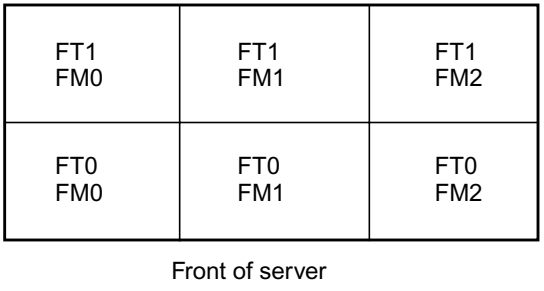


FIGURE 3-20 System Designation of Fan Connector Boards and Fan Modules

1. **If the server is in a rack, slide it far enough from the rack so that you can open the fan bay door. If you cannot safely view and access the component, remove the server from the rack.**

2. **Open the door to the fan bay and identify the defective fan module(s).**
   - Fan module LED lit: The fan module is faulty and should be replaced.
   - Fan module LED off: The fan module is operating properly.

Caution – When you open the fan bay door, be careful to hold it open with one hand so that it does not spring shut and injure your fingers. Do not hold the fan bay door open for more than 60 seconds while the server is running to avoid overheating.

---

3. **While holding the fan bay door open, grasp the faulty fan module by its plastic strap and lift it straight up out of the fan bay. See** FIGURE 3-21**.**

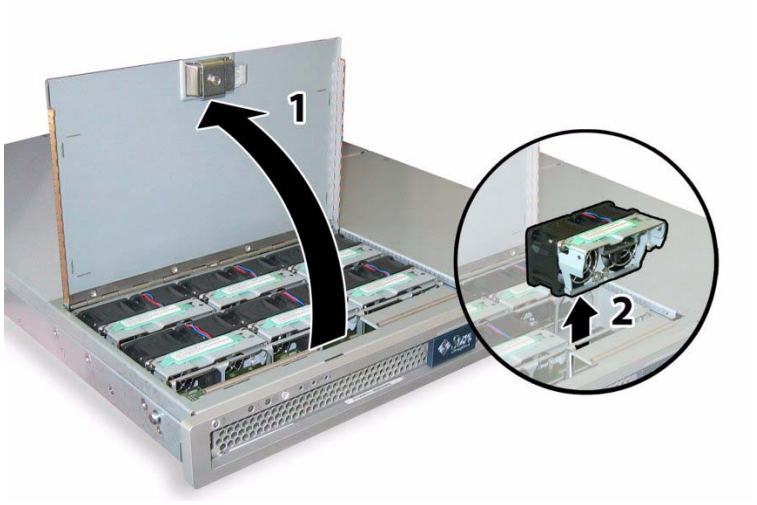


FIGURE 3-21 Opening the Fan Bay Door and Removing a Fan Module

Installation is the reverse of this procedure.

3.4.6 Replacing a Fan Connector Board

Follow these steps to remove and replace a fan connector board.

Note – This component is a CRU and can be replaced by anyone.

TABLE 3-6 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-6 Sun Fire X4100 Supported Fan Connector Board Part Numbers

Component	Part Number
Fan connector board	501-6917

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can open the fan bay door. If you cannot safely view and access the component, remove the server from the rack.**
3. **Open the fan bay door and hold it open. See** FIGURE 3-22**.**

Caution – When you open the fan bay door, be careful to hold it open with one hand so that it does not spring shut and injure your fingers. Do not hold the fan bay door open for more than 60 seconds while the server is running to avoid overheating the server.

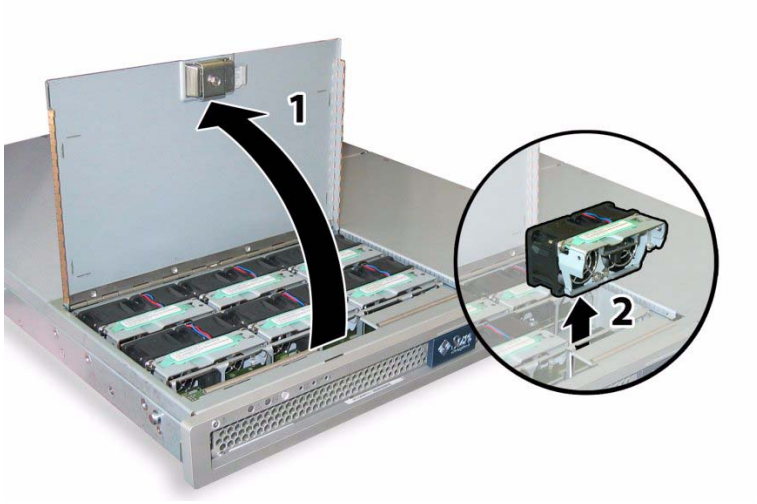


FIGURE 3-22 Opening the Fan Bay Door and Removing a Fan Module

4. **Remove the three fan modules that are connected to the fan connector board that you are replacing. Grasp each fan module by its plastic strap and lift it straight up out of the fan bay.**

5. **Unfasten the single screw that secures the fan connector board to the chassis. See** FIGURE 3-23**.**

Note – In the following figures, the server is shown from a rear view with the front cover off and all fans removed to provide visibility. Do not remove the covers for this procedure.

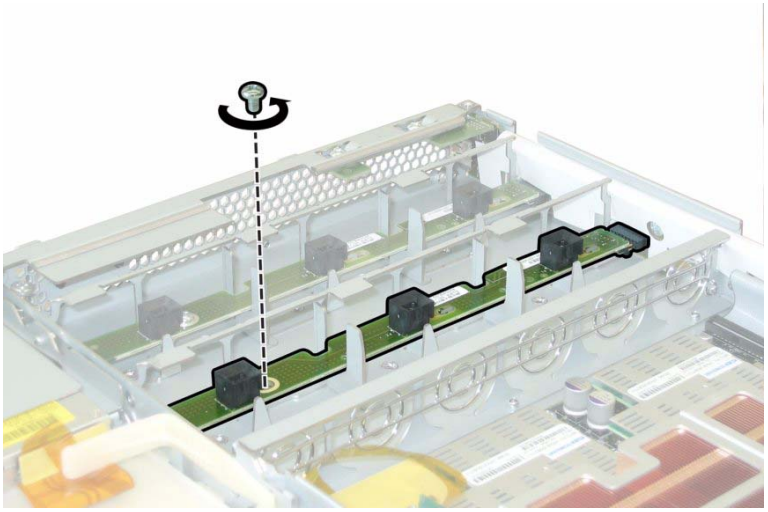


FIGURE 3-23 Unfastening the Fan Connector Board Securing Screw

6. **Slide the fan connector board toward the center of the chassis to disconnect it from the front I/O board and to release it from the two locating tabs on the chassis. See** FIGURE 3-24**.**
7. **Lift the board straight up to remove it from the system.**

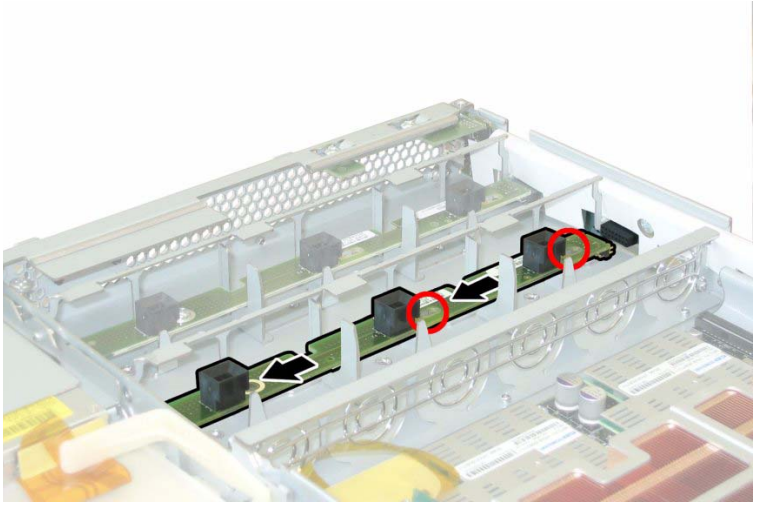


FIGURE 3-24 Releasing the Fan Connector Board

Installation is the reverse of this procedure.

3.4.7 Replacing the Front Panel Indicator Board

Follow these steps to remove and replace a front panel indicator board.

Note – This component is a CRU and can be replaced by anyone.

TABLE 3-7 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-7 Sun Fire X4100 Supported Front Panel Indicator Board Part Numbers

Component	Part Number
Indicator board (front panel)	501-6916

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**
3. **Remove the front bezel as described in Section 3.2.3, "Removing the Front Bezel" on page 3-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

4. **Remove the front cover as described in Section 3.2.4, "Removing the Front Cover" on page 3-5.**
5. **Unfasten the two screws that secure the front panel indicator board to the chassis.**

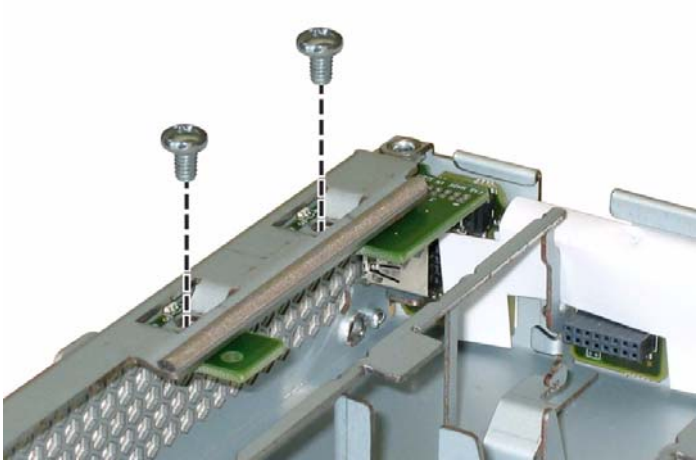


FIGURE 3-25 Unfastening the Front Panel Indicator Board Screws

6. **While supporting the indicator board with your right hand, use your left hand to gently push the indicator board toward the center of the chassis to disconnect it from the front I/O board. See** FIGURE 3-26**.**

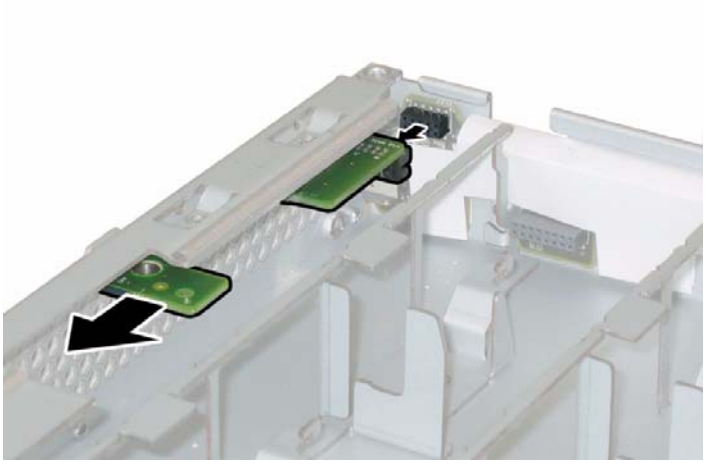


FIGURE 3-26 Removing the Front Panel Indicator Board

7. **Lift the front panel indicator board from the chassis.**

   Installation is the reverse of this procedure.

3.4.8 Replacing the Front I/O Board

Follow these steps to remove and replace the front I/O board.

Note – This component is a FRU and should be replaced *only* by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 3-8 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-8 Sun Fire X4100 Supported Front I/O Board Part Numbers

Component	Part Number
Front I/O board (for Sun Fire X4100)	501-6918

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **Disconnect any external cables from the front I/O board's USB connectors.**
3. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
4. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**
5. **Remove the front bezel as described in Section 3.2.3, "Removing the Front Bezel" on page 3-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

6. **Remove the front cover as described in Section 3.2.4, "Removing the Front Cover" on page 3-5.**
7. **Remove all six fan modules by lifting each fan module by its plastic strap to disconnect it from its fan connector board.**
8. **Remove both fan connector boards:**
   a. **Unfasten the single screw that secures each fan connector board to the chassis. See** FIGURE 3-27**.**

Note – In the following figures, the server is shown from a rear view with the front cover off and all fans removed to provide visibility.

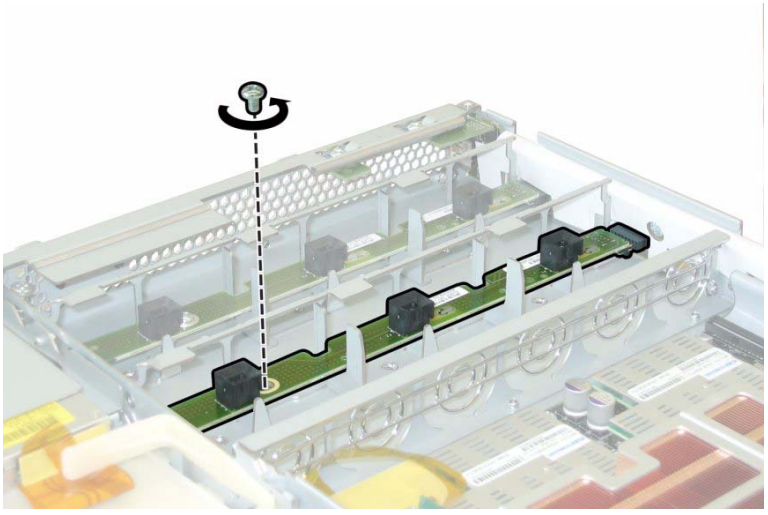


FIGURE 3-27 Unfastening the Fan Connector Board Securing Screw

b. Slide each fan connector board toward the center of the chassis, to disconnect them from the front I/O board and to release each board from the locating tabs on the chassis. See FIGURE 3-28**.**

c. Lift the fan connector boards straight up to remove them from the system.

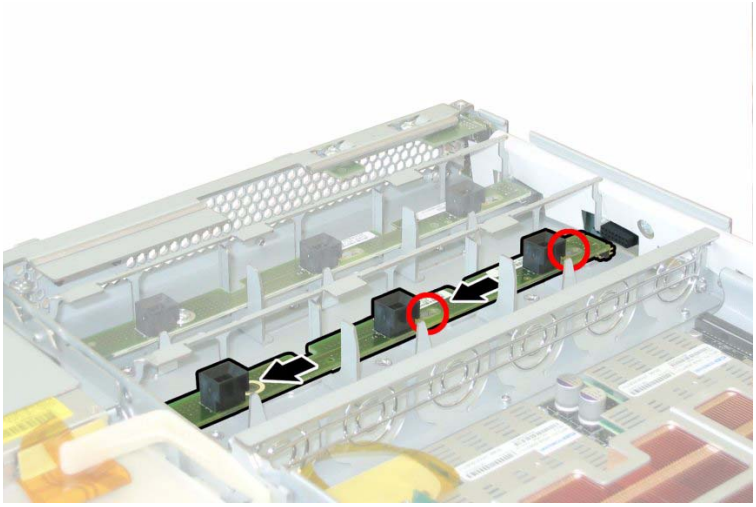


FIGURE 3-28 Releasing the Fan Connector Board

9. **Remove the front panel indicator board:**

   a. **Unfasten the two screws securing the front panel indicator board to the chassis. See** FIGURE 3-29**.**

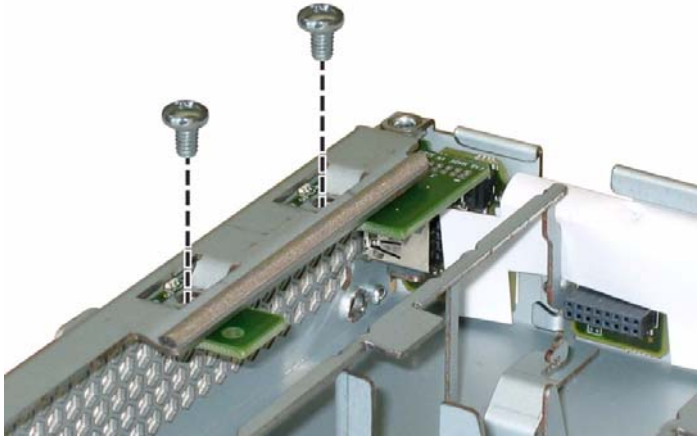


FIGURE 3-29 Unfastening the Front Panel Indicator Board Screws

   b. **While supporting the indicator board with your right hand, use your left hand to gently push the indicator board toward the center of the chassis to disconnect it from the front I/O board. See** FIGURE 3-30**.**

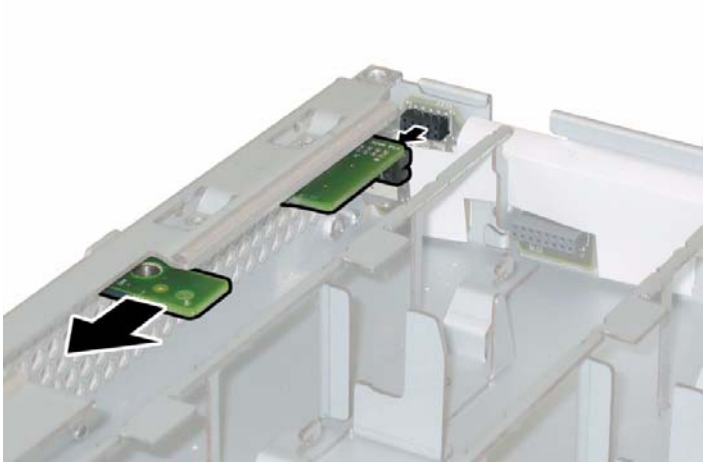


FIGURE 3-30 Removing the Front Panel Indicator Board

c. Remove the indicator board from the chassis.

10. Disconnect the interconnect cable that connects the front I/O board to the motherboard. See FIGURE 3-31**.**

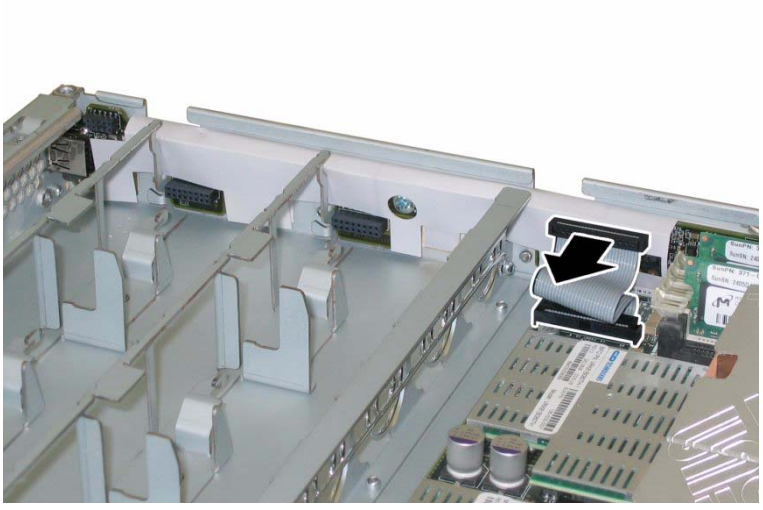


FIGURE 3-31 Disconnecting the Interconnect Cable From the Front I/O Board

11. Unfasten the screw that secures the front I/O board to the chassis. See FIGURE 3-32**.**

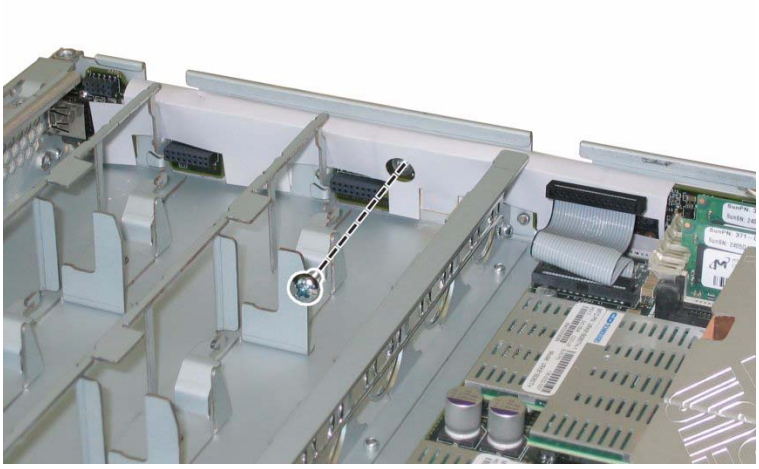


FIGURE 3-32 Unfastening the Front I/O Board Screw From the Chassis

---

Note – The white plastic sheath that is attached to the front I/O board is an insulator, which protects the board components. Do not remove this insulator sheath from the front I/O board.

---

12. **Gently push the front I/O board toward the rear of the chassis approximately 0.25 inch (6 mm), freeing the board from the two locating tabs at its bottom-left and bottom-right corners. See** FIGURE 3-33**.**

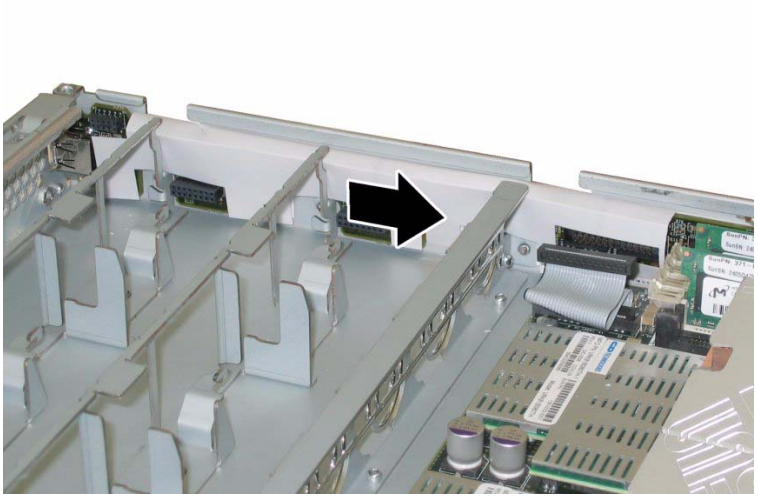


FIGURE 3-33 Releasing the Front I/O Board From the Chassis Locating Tabs

13. **Lift the front I/O board straight up and out of the chassis.**

    Installation is the reverse of this procedure.

3.4.9 Replacing the Graphics Redirect and Service Processor (GRASP) Board

Follow these steps to remove and replace the Graphics Redirect and Service Processor (GRASP) board.

Note – This component is a FRU and should be replaced *only* by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 3-9 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-9 Sun Fire X4100 Supported GRASP Board Part Numbers

Component	Part Number
GRASP board	501-6979

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**

Caution – There is a power status LED (CR1) on the GRASP board that indicates whether 3.3V standby power is reaching the GRASP board. The GRASP board is not hot-swappable and should never be removed while this LED is lit.

---

4. **Squeeze the plastic standoff that protrudes through the GRASP board to press the standoff's locking tabs. See** FIGURE 3-34**.**

   If you have difficulty pressing the locking tabs with your fingers, you can use a pair of long-nosed pliers.

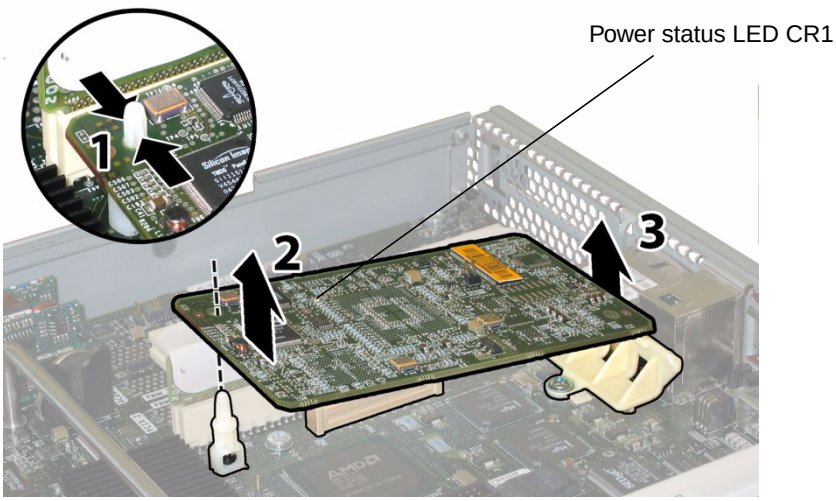


FIGURE 3-34 Removing the GRASP Board

5. **Raise the corner of the GRASP board until it is clear of the locking tab.**
6. **Pivot the front edge of the GRASP board upward to disengage it from the rear plastic bracket and to disengage its connector from the motherboard.**

Note – Be careful to avoid bending the GRASP board while removing or installing it.

Installation is the reverse of this procedure.

3.4.10 Replacing a Hard Disk Drive

Follow these steps to remove and replace a hard disk drive (HDD).

Note – This component is a hot-swappable CRU and can be replaced by anyone.

The internal system software designation of the HDDs is shown in FIGURE 3-35. HDD 0 and HDD 1 are included in the standard system configuration; HDD 2 and HDD 3 are shown to represent the optional factory configuration of four hard drives (no DVD-ROM drive).

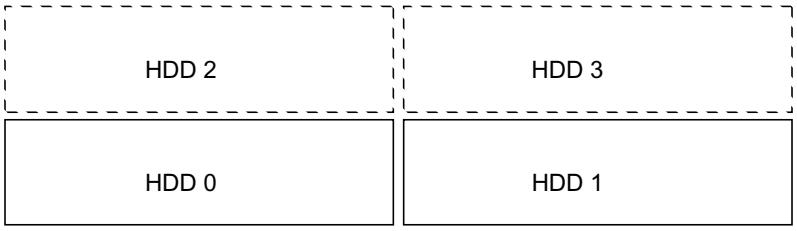


FIGURE 3-35 Sun Fire X4100 Designation of Hard Disk Drives

A single HDD failure will not cause a data failure if the HDDs are configured as a mirrored RAID 1 volume (optional). The HDD can be hot-swapped, and when a new HDD is inserted, the contents are automatically rebuilt from the rest of the array with no need to reconfigure the RAID parameters. If the bad HDD was configured as a hot-spare, the new HDD is automatically configured as a new hot-spare to mirror the data from the good HDD.

Caution – Possible data loss: If you insert a HDD that has been configured with a RAID volume into a server that did not previously have its HDDs configured with RAID volumes, the existing HDD(s) in the server will be converted to RAID volumes during automatic synchronization and any existing data on the existing HDD(s) in the server will be erased. Before permanently removing a HDD that is part of an active RAID volume, use the LSI Configuration Utility to delete the RAID volume from the HDD to avoid causing this problem.

For information about the implementation of RAID on this server and instructions on how to use the LSI Logic Fusion-MPT Serial Attached SCSI (SAS) BIOS Configuration Utility to configure RAID for your server, see Section E.4, "Performing RAID Configuration Tasks" on page E-41.

TABLE 3-10 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-10 Sun Fire X4100 Supported HDD Part Numbers

Component	Part Number
36-GB 10K RPM 2.5-inch SAS drive (RoHS-compliant, replaces 540-6358)	540-6610
73-GB 10K RPM 2.5-inch SAS drive (RoHS-compliant, replaces 541-0323)	540-6611

1. **Observe the LEDs on the faces of the HDDs and identify the defective HDD:**
   - Middle LED on (amber): The drive is faulty and should be replaced.
   - Bottom LED on (green): The drive is operating properly.

Note – When you replace the HDDs to their bays, you must return each HDD to the bay from which it was removed. Use an adhesive note or another method to temporarily label the HDDs when you remove them.

---

2. **Press the button on the face of the HDD to release the spring-loaded securing latch. See** FIGURE 3-36**.**
3. **Grasp the securing latch and remove the HDD from the drive bay.**

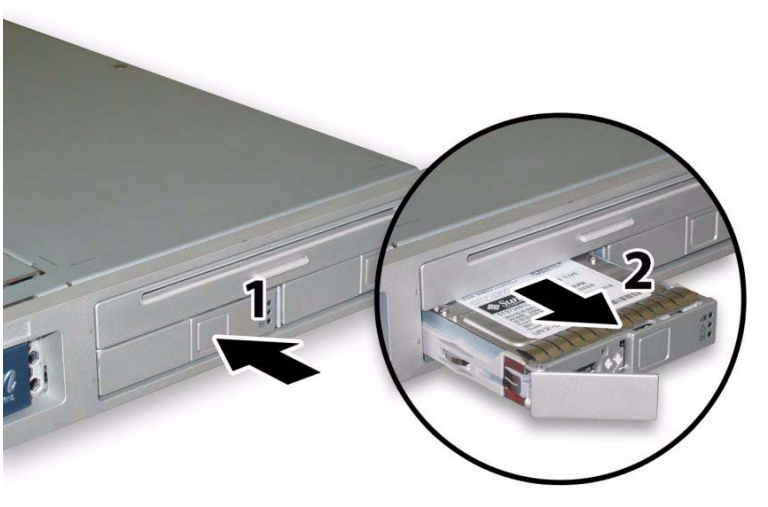


FIGURE 3-36 Opening the Hard Disk Drive Latch

Installation is the reverse of this procedure.

Note – If the HDDs were previously configured as a mirrored RAID 1 array, an automatic resynchronization is invoked and the contents are automatically rebuilt from the rest of the array with no need to reconfigure the RAID parameters. If the bad HDD was configured as a hot-spare, the new HDD is automatically configured as a new hot-spare.

Note – When you install an HDD, open its securing latch before you push the drive into the bay. Push the HDD into the bay until it stops, then close the securing latch to fully engage the connector on the HDD backplane.

Note – For Sun Fire X4100 servers with the factory-configured option for four hard disk drives: You must remove the top two hard disk drives before reinstalling the front cover to provide clearance for the front cover to slide on the chassis. Reinstall the top two hard disk drives after you reinstall the front cover.

3.4.11 Replacing a Hard Disk Drive Backplane

Follow these steps to remove and replace the HDD backplane.

Note – This component is a FRU and should be replaced *only* by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 3-11 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-11 Sun Fire X4100 Supported HDD Backplane Part Numbers

Component	Part Number
Hard disk drive backplane (for Sun Fire X4100)	501-6919

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**
4. **Remove the front bezel as described in Section 3.2.3, "Removing the Front Bezel" on page 3-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 3.2.4, "Removing the Front Cover" on page 3-5.**
6. **Label the HDDs with adhesive notes or another method so that you will know where to reinstall them at the end of the procedure.**

Note – When you replace the HDDs to their bays, you must return each HDD to the bay from which it was removed. Use an adhesive note or another method to temporarily label the HDDs after you remove them.

---

7. **Remove all HDDs from the drive bays:**

   a. **Press the button on the face of the HDD to release the spring-loaded securing latch. See** FIGURE 3-37**.**

   b. **Grasp the securing latch and remove the HDD from the drive bay.**

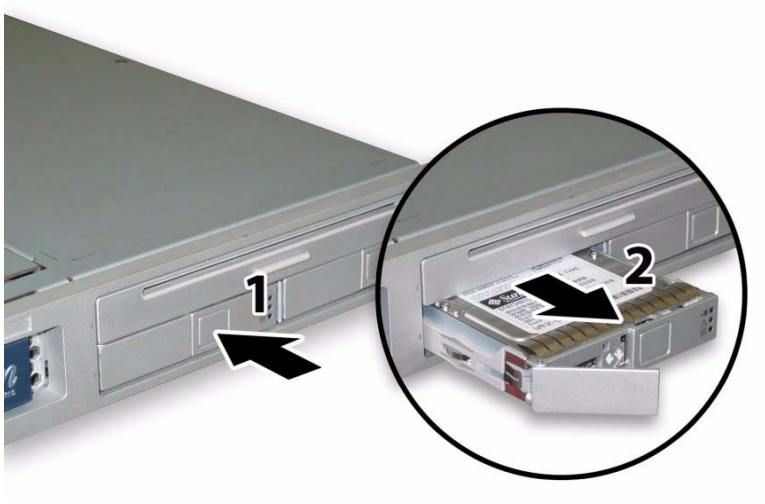


FIGURE 3-37 Opening the Hard Disk Drive Latch

8. **Unfasten the spring-loaded thumbscrew that secures the flex cable retainer and remove this retainer from the chassis. See** FIGURE 3-38**.**

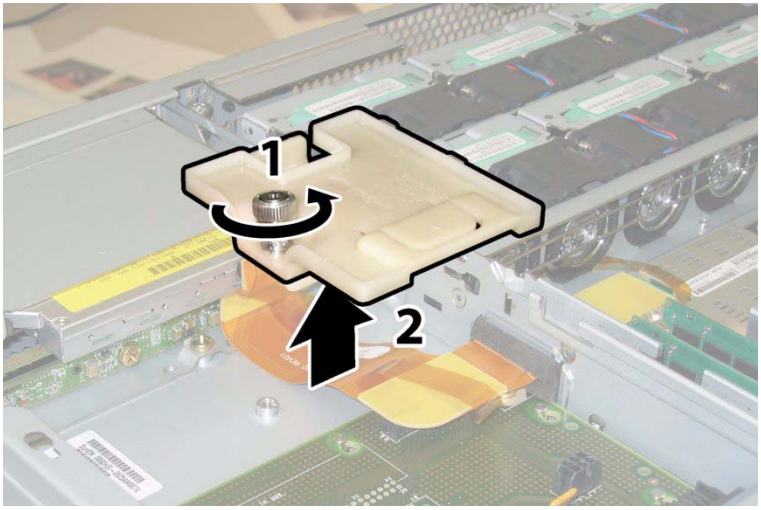


FIGURE 3-38 Removing the Flex Cable Retainer

9. **Remove the upper cable retainer from the chassis. Push the retainer toward the rear of the chassis to free it from the keyed openings in the chassis midwall. See** FIGURE 3-39**.**

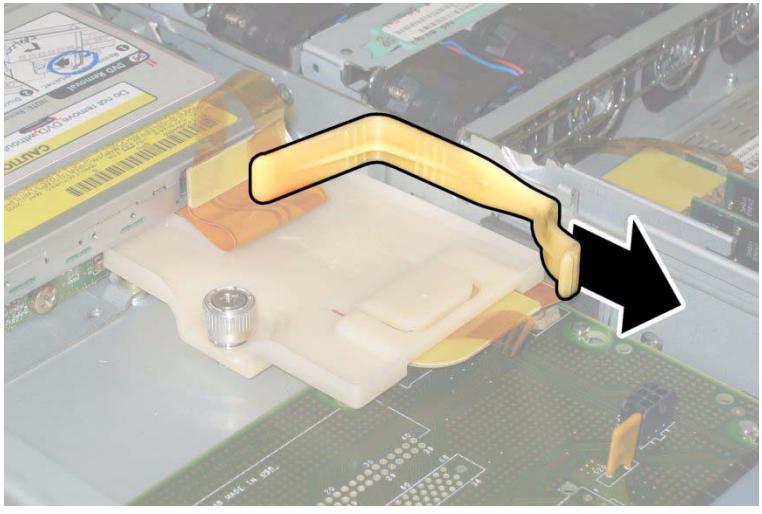


FIGURE 3-39 Removing the Upper Cable Retainer

10. **Disconnect the flex cable connectors from the rear of the DVD-ROM drive and the HDD backplane. See** FIGURE 3-40**.**

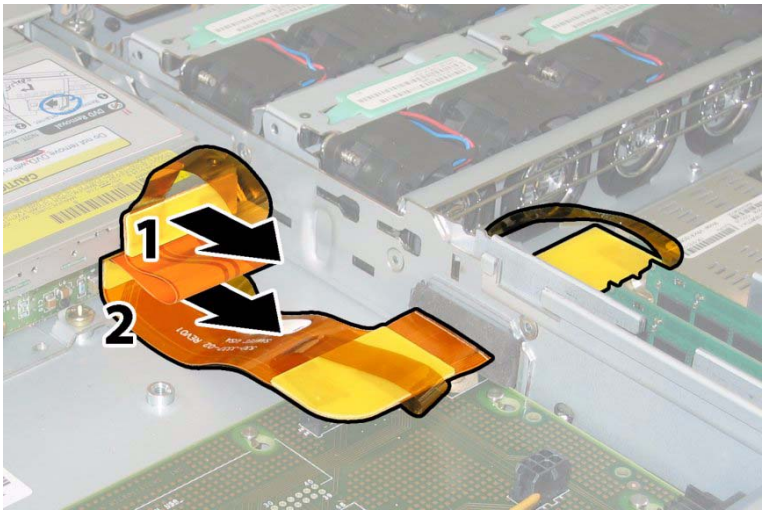


FIGURE 3-40 Disconnecting the Flex Cable From the DVD Drive and the HDD Backplane

11. **Remove the DVD-ROM drive:**

    a. **Pull the spring latch at the front of the DVD-ROM drive to the left and hold it. See** FIGURE 3-41**.**

    b. **Use your other hand to reach behind the drive and push it out through the front of the chassis.**

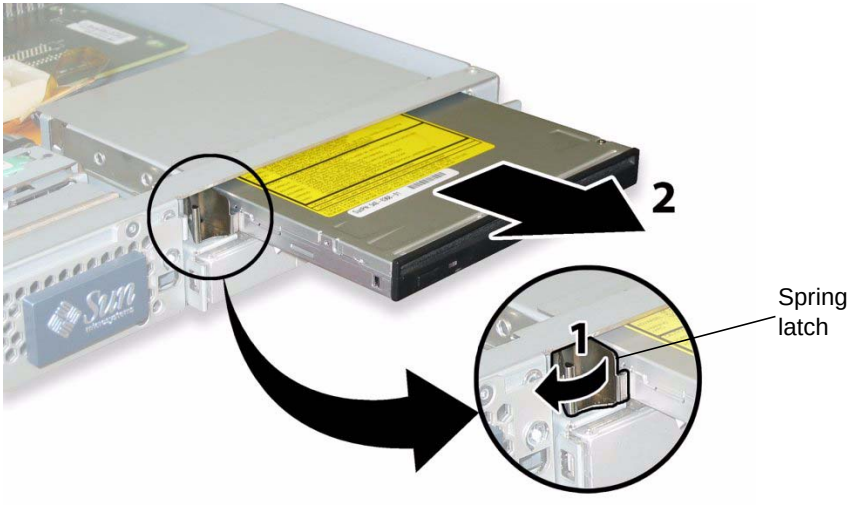


FIGURE 3-41 Removing the DVD-ROM Drive

12. **Unfasten the screws that secure the HDD backplane to the rear of the drive bays. See** FIGURE 3-42**.**
    - If your Sun Fire X4100 server has two HDDs, the HDD backplane has 3 screws.
    - If your Sun Fire X4100 server has four HDDs, the HDD backplane has 5 screws.
13. **Remove the HDD backplane from the chassis.**

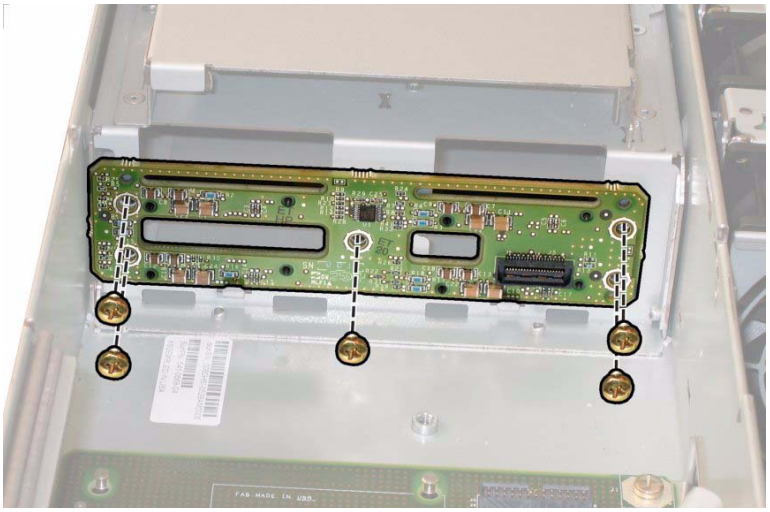


FIGURE 3-42 Removing the HDD Backplane (Five-Screw Version Shown)

Installation is the reverse of this procedure.

Note – When you replace the HDDs to their bays, you must return each HDD to the bay from which it was removed. If the HDDs were previously configured as a mirrored RAID 1 array, an automatic resynchronization is invoked with no need to reconfigure the RAID parameters. Any hot-spares are automatically reconfigured as hot-spares in the configuration.

Note – When you reinstall a HDD, open its securing latch before you push the drive into the bay. Push the HDD into the bay until it stops, then close the securing latch to fully engage the connector on the HDD backplane.

3.4.12 Replacing Memory Modules (DIMMs)

Follow these steps to remove and replace the server's dual inline memory modules (DIMMs).

Note – This component is a CRU and can be replaced by anyone.

TABLE 3-12 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-12 Sun Fire X4100 Supported DIMM Part Numbers

Component	Part Number
1 GB (DIMM pair 2 x 512-MB DDR1/400)	540-6454
2 GB (DIMM pair 2 x 1-GB DDR1/400)	540-6453
4 GB (DIMM pair 2 x 2-GB DDR1/400)	540-6497

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**
4. **Locate the DIMM slot on the motherboard to which you will install or replace a DIMM.**

   The DIMM ejector levers contain LEDs that can indicate a faulty DIMM:

   - DIMM ejector LED is off: DIMM is operating properly.
   - DIMM ejector LED is on (amber): DIMM is faulty and should be replaced.

Note – To see the fault LEDs in the ejector levers of the DIMM slots, you must put the server in standby power mode, with the AC power cords attached. See Section 3.2.1, "Powering Off the Server" on page 3-2.

The internal system software designation of the DIMM slots is shown in FIGURE 3-43.

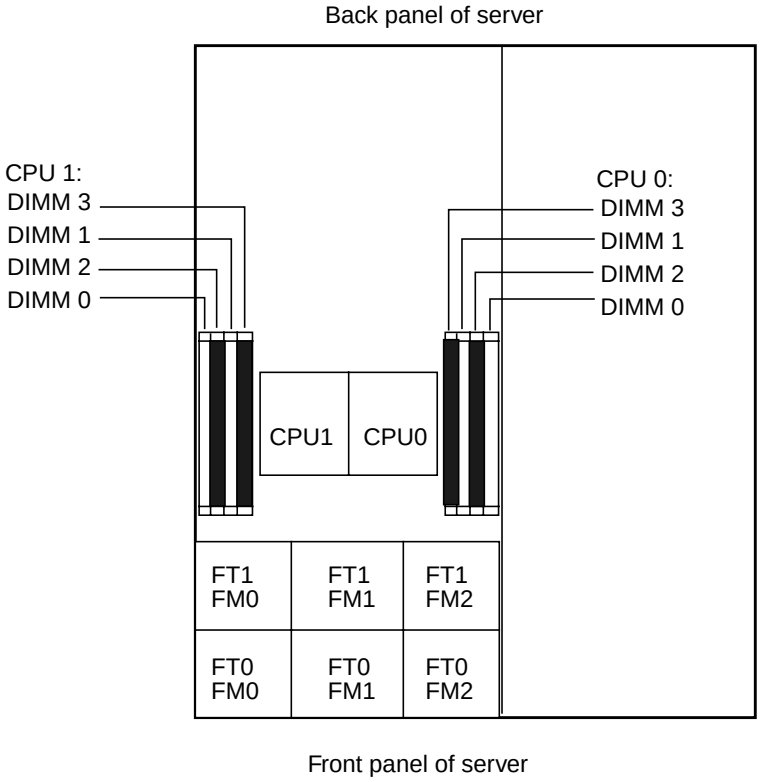


FIGURE 3-43 Sun Fire X4100 Designation of DIMM Slots

5. **Review the following list of memory configuration guidelines and the supported DIMM configurations listed in** TABLE 3-13 **before you remove or install any DIMMs:**
   - Each CPU can support a maximum of four DIMMs.
   - The DIMM slots are paired and the DIMMs must be installed in pairs (0 and 1, 2 and 3). See FIGURE 3-43 and TABLE 3-13. The memory sockets are colored black or white to indicate which slots are paired by matching colors.
   - CPUs with only a single pair of DIMMs must have those DIMMs installed in that CPU's white DIMM slots (0 and 1). See FIGURE 3-43.
   - Only PC3200 ECC and PC2700 ECC Registered DIMMs are supported.
   - Each pair of DIMMs must be identical (same manufacturer, size, and speed).

TABLE 3-13 Supported DIMM Configurations

Slot 3	Slot 1	Slot 2	Slot 0	Total Memory Per CPU
0	512 MB	0	512 MB	1 GB
512 MB	512 MB	512 MB	512 MB	2 GB
512 MB	1 GB	512 MB	1 GB	3 GB
512 MB	2 GB	512 MB	2 GB	5 GB
0	1 GB	0	1 GB	2 GB
1 GB	512 MB	1 GB	512 MB	3 GB
1 GB	1 GB	1 GB	1 GB	4 GB
1 GB	2 GB	1 GB	2 GB	6 GB
0	2 GB	0	2 GB	4 GB
2 GB	512 MB	2 GB	512 MB	5 GB
2 GB	1 GB	2 GB	1 GB	6 GB
2 GB	2 GB	2 GB	2 GB	8 GB

6. **To remove a DIMM:**

   a. **Rotate both DIMM slot ejectors outward as far as they will go. The DIMM is partially ejected from the socket. See** FIGURE 3-44**.**

   b. **Carefully lift the DIMM straight up to remove it from the socket.**

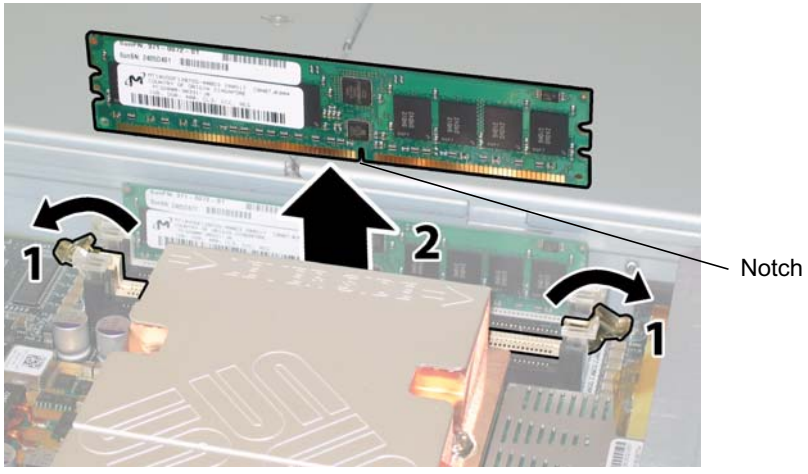


FIGURE 3-44 Removing a DIMM

7. **To install a DIMM:**

   a. **Ensure that the DIMM slot ejectors at each end of the memory socket are fully open (rotated outward) to accept the new DIMM.**

   b. **Align the notch in the bottom edge of the DIMM with the key in the DIMM socket. See** FIGURE 3-44**.**

   c. **Press down evenly on both top corners of the DIMM until the ejectors snap over the cutouts in the left and right edges of the DIMM.**

3.4.13 Replacing the Motherboard

Follow these steps to remove and replace the motherboard.

Note – This component is a FRU and should be replaced *only* by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 3-14 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-14 Sun Fire X4100 Supported Motherboard Part Numbers

Component	Part Number
Motherboard, Sun Fire X4100 (RoHS-compliant, replaces 501-7261 and 501-7644)	501-7513

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**
4. **Remove the front bezel as described in Section 3.2.3, "Removing the Front Bezel" on page 3-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 3.2.4, "Removing the Front Cover" on page 3-5.**
6. **Remove all PCI cards:**
   a. **Disconnect any external cables from the PCI cards.**
   b. **Working from the rear of the chassis, pivot each card latch up to release the rear of the PCI cards. See** FIGURE 3-45 **for the latch location.**

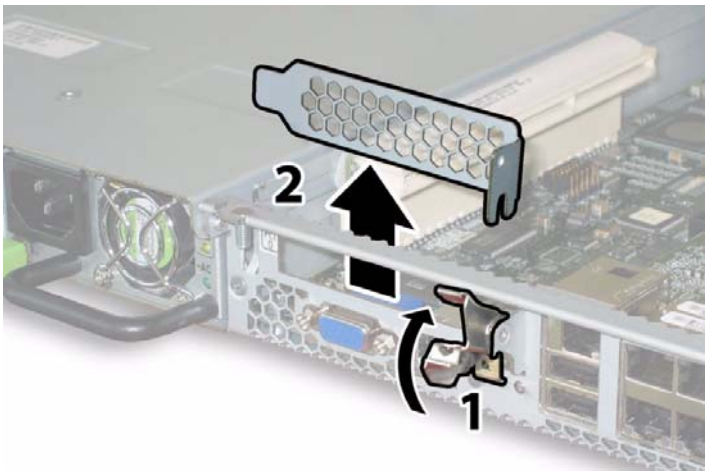


FIGURE 3-45 Opening a PCI Card Latch

c. Pull the PCI card out of the PCI riser. Ensure that the PCI card's rear connector panel is released from the tab on the chassis rear panel.

7. Remove the Graphics Redirect and Service Processor (GRASP) board:

a. Disconnect any external cables from the GRASP board's connectors.

b. Squeeze the plastic standoff that protrudes through the GRASP board to press the standoff's locking tabs. See FIGURE 3-46**.**

If you have difficulty pressing the locking tabs with your fingers, you can use a pair of thin-nosed pliers.

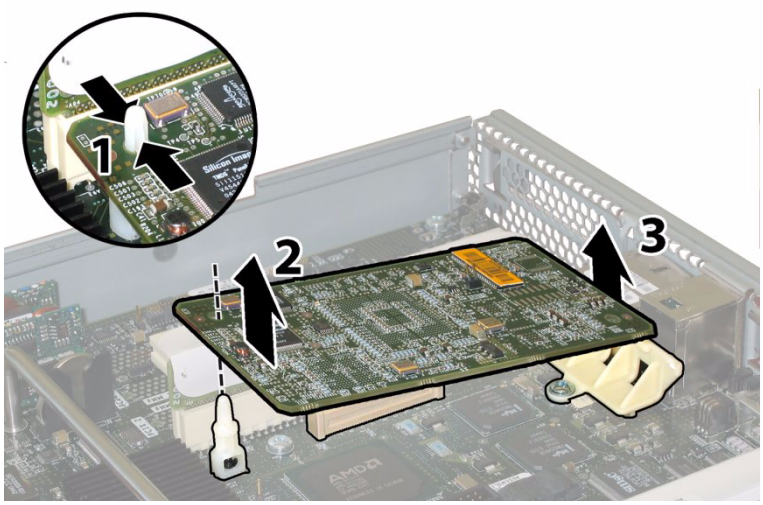


FIGURE 3-46 Removing the GRASP Board

c. **Raise the corner of the GRASP board until it is clear of the locking tab.**

d. **Pivot the front edge of the GRASP board upward to disengage it from the rear plastic bracket and to disengage its connector from the motherboard.**

8. **Remove all DIMMs from the motherboard:**

a. **Rotate both DIMM slot ejectors outward as far as they will go. The DIMM is partially ejected from the socket. See** FIGURE 3-47**.**

b. **Carefully lift the DIMM straight up to remove it from the socket.**

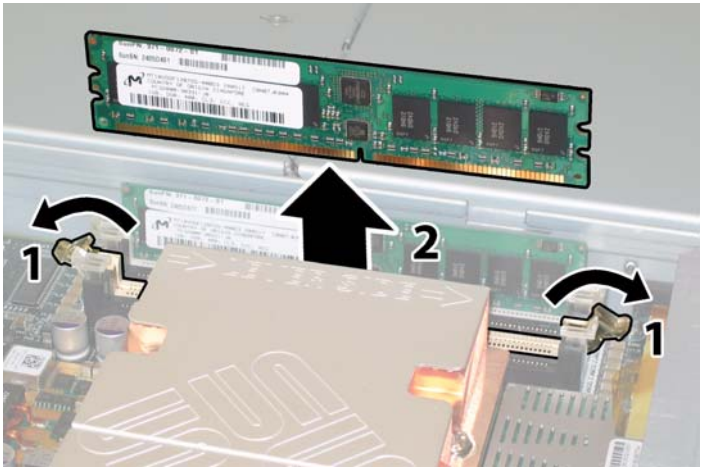


FIGURE 3-47 Removing a DIMM

9. **Remove all CPUs from the motherboard:**

   a. **Hold down on the top of the heatsink to prevent it from tipping unevenly while you alternately loosen the two spring-loaded mounting screws that secure the heatsink to the motherboard. Turn the screws 180-degrees at a time, then remove the screws when they are detached. See** FIGURE 3-48 **and** FIGURE 3-49**.**

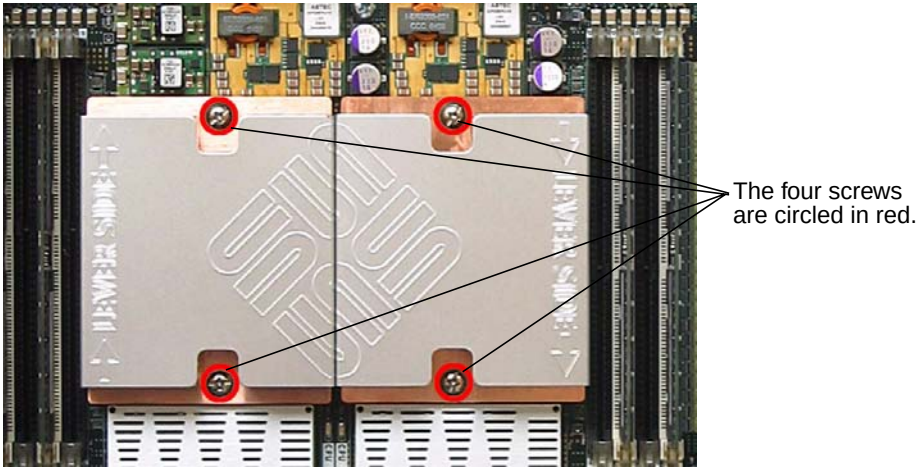


FIGURE 3-48 Location of the Heatsink Screws

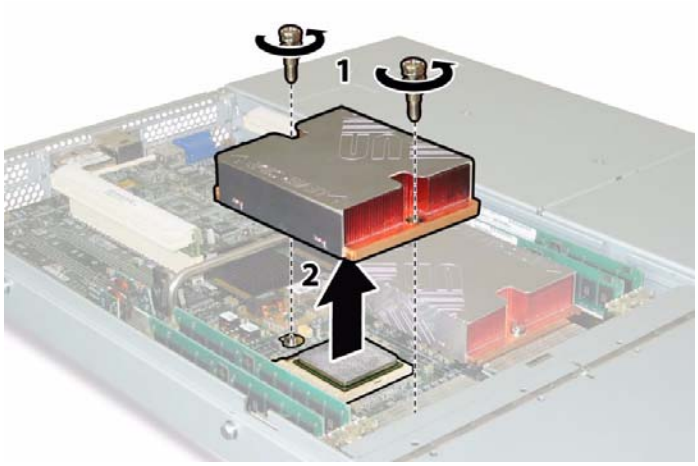


FIGURE 3-49 Removing the Heatsink

b. Twist the heatsink slightly to lift it off of the CPU. Turn the heatsink upside down and allow the spring in each of the two mounting holes to fall out into your hand.

Note – Set the heatsink upside down on a clean, flat surface to prevent the thermal grease from contaminating other components.

---

c. Pull the socket lever slightly away from the socket. See FIGURE 3-50**.**

d. Pivot the lever up, into the fully open, vertical, position.

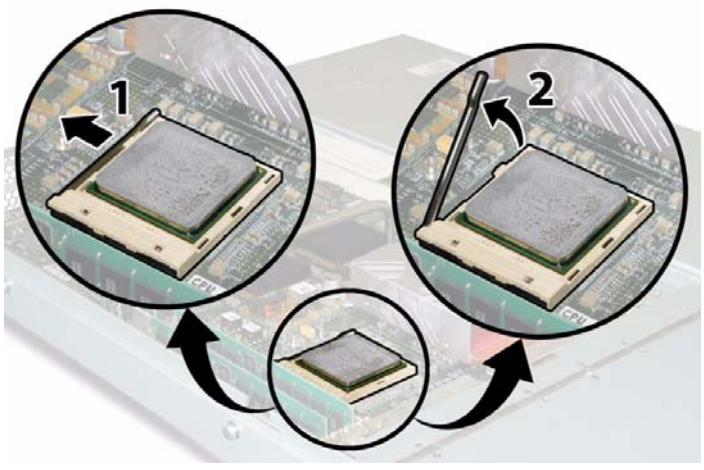


FIGURE 3-50 Releasing the CPU Socket Lever

e. **Lift the CPU out of the socket, leaving the lever in the vertical, open position. See** FIGURE 3-51**.**

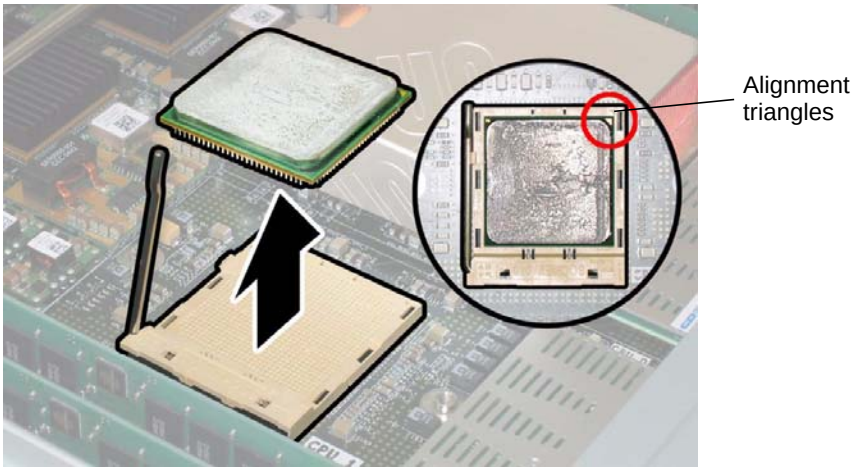


FIGURE 3-51 Removing the CPU From the Socket

10. **Disconnect and remove the front I/O interconnect cable that connects the motherboard and the front I/O board.**

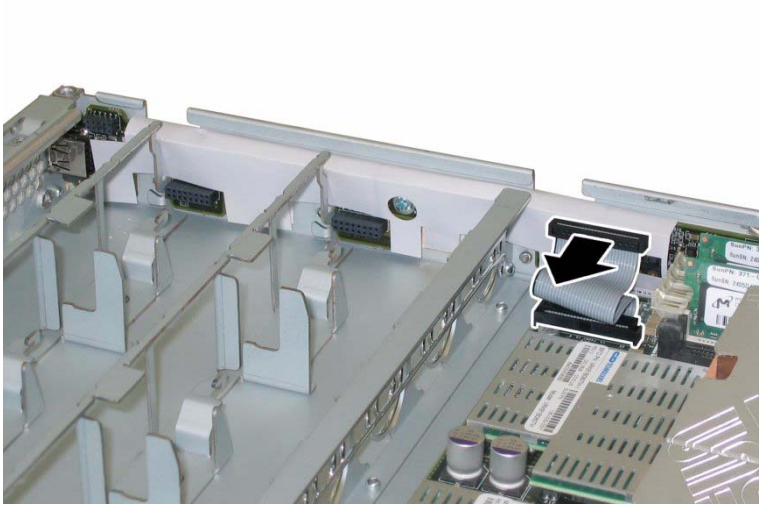


FIGURE 3-52 Disconnecting the Front I/O Interconnect Cable

11. **Unfasten the spring-loaded thumbscrew that secures the flex cable retainer and remove this retainer from the chassis. See** FIGURE 3-53**.**

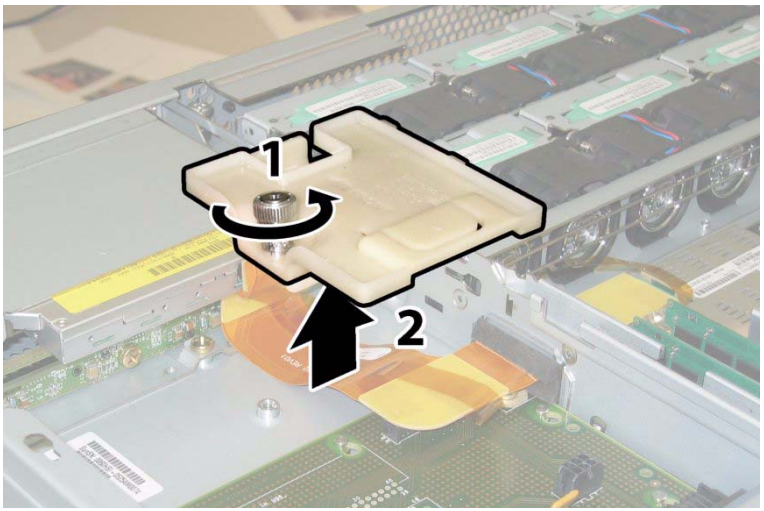


FIGURE 3-53 Removing the Flex Cable Retainer

12. **Remove the upper cable retainer from the chassis. Push the retainer toward the rear of the chassis to free it from the keyed openings in the chassis midwall. See** FIGURE 3-54**.**

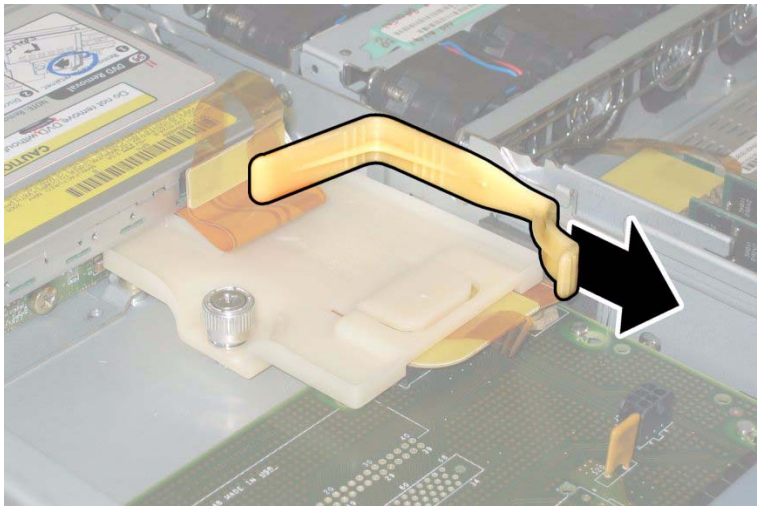


FIGURE 3-54 Removing the Upper Cable Retainer

13. **Remove the flex cable and its attached foam rubber gasket from the chassis midwall by disconnecting the cable's four connectors from the following four locations. See** FIGURE 3-55**.**

    1. DVD-ROM drive
    2. Hard disk drive backplane
    3. Power distribution board
    4. Motherboard

Note – When reinstalling the flex cable, attach the connector to the power distribution board (3) first. Then attach the remaining three connectors in any order.

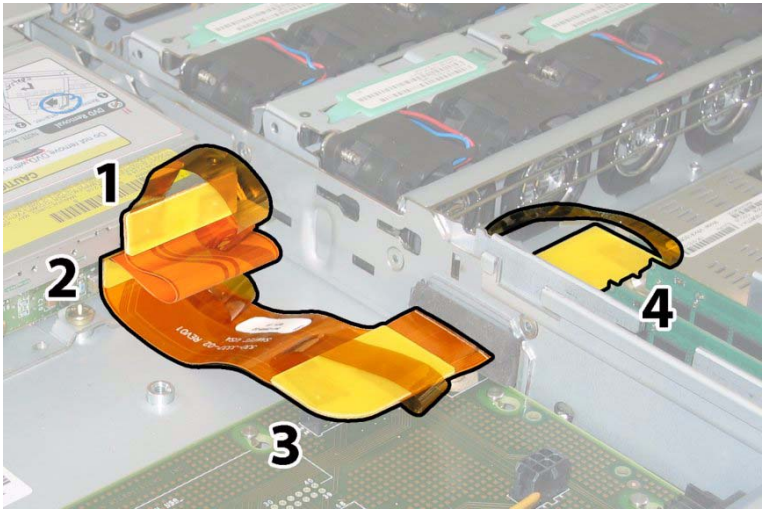


FIGURE 3-55 Disconnecting the Flex Cable's Four Connectors

14. **Unfasten and remove the eight screws that secure the motherboard to the chassis floor. See** FIGURE 3-56 **for the location of the eight screws.**

15. **Use an 8-mm nut-driver to remove the bus-bar nuts from the motherboard. See** FIGURE 3-56**.**

Note – If you remove the HDDs from the server for any reason during this procedure, you must return each HDD to the bay from which it was removed. Use an adhesive note or another method to temporarily label the HDDs after you remove them.

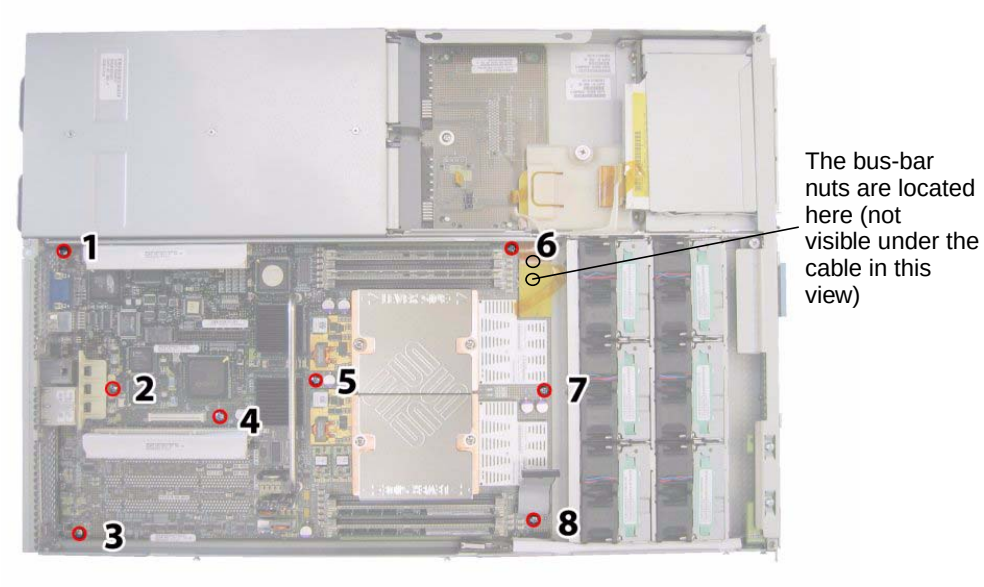


FIGURE 3-56 Motherboard Securing Screw and Bus-Bar Nut Locations

16. **Use the lifting handle to raise the forward edge of the board until it has cleared the bus bar studs.**

Caution – When lifting the board, use caution to avoid damaging the light pipes and connectors on the rear edge of the motherboard.

17. **Slide the board toward the front of the chassis until the connectors and light pipes are clear of the chassis back panel. Then raise the motherboard and remove it from the chassis.**

Caution – When reinstalling the CPUs and heatsinks to the motherboard, follow the instructions in Section 3.4.2, "Replacing a CPU and Heatsink" on page 3-10.

Installation is the reverse of this procedure.

Note – If you removed the HDDs from the server, when you replace the HDDs to their bays, you must return each HDD to the bay from which it was removed. If the HDDs were previously configured as a mirrored RAID 1 array, an automatic resynchronization is invoked with no need to reconfigure the RAID parameters. Any hot-spares are automatically reconfigured as hot-spares in the configuration.

3.4.14 Replacing PCI Cards

Follow these steps to remove and replace a PCI card.

Note – This component is a CRU and can be replaced by anyone.

TABLE 3-15 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-15 Sun Fire X4100 Supported PCI Card Part Numbers

Component	Part Number
PCIX Cards	
LSI single-port U320 SCSI HBA	375-3255
2-GB single-port x86 HBA	375-3253
2-GB dual-port Fibre Channel HBA	375-3108
4-GB single-port Fibre Channel HBA	375-3354
4-GB dual-port Fibre Channel HBA	375-3294
Sun 2-port 4x IB HCA, LP	375-3260
Dual Gigabit-Ethernet (copper)	371-0911
Dual Gigabit-Ethernet (Fibre Channel)	371-0912
Sun 10-GB Ethernet LP	375-3301
LSI single-port U320 SCSI HBA	375-3255

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**
4. **Locate the PCI card slot in which you will install or replace a PCI card.**

   The server is shipped with two PCI risers already installed in the low-profile PCI card sockets.

The system designation and the speeds of the two PCI slots are shown in FIGURE 3-57.

The slots for the PCI cards are detected by the system BIOS during bootup in the order described in Section 2.3.2.1, "PCI Card Slot Booting Priority" on page 2-5.

Note – Before you install a card, consult the manufacturer's documentation for system requirements and configuration information for your specific PCI card.

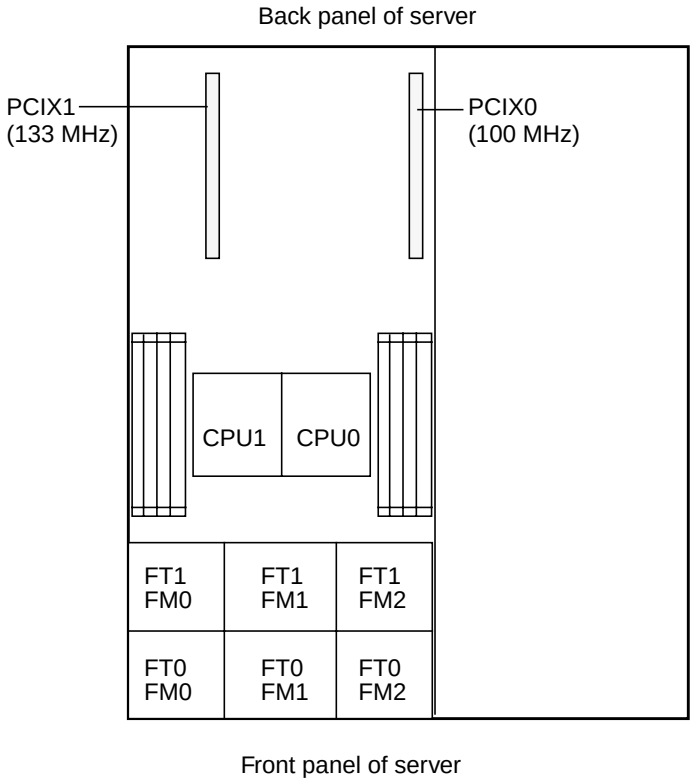


FIGURE 3-57 Sun Fire X4100 Designation and Speeds of PCI Slots

5. **Remove any existing PCI card from the slot, or go to Step 6 if the slot is empty:**

   a. **Disconnect any external cables that are attached to the PCI card.**

   b. **Working from the rear of the chassis, pivot the PCI card latch for the slot upward. See** FIGURE 3-58**.**

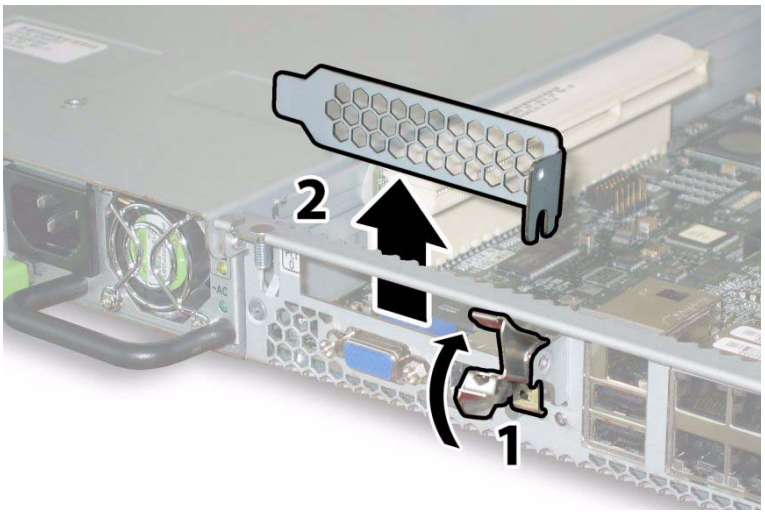


FIGURE 3-58 Releasing a PCI Card Securing Latch

c. Pull the PCI card out of the PCI riser. Ensure that the PCI card's rear connector panel is released from the tab on the chassis rear panel.

6. Install a PCI card:

a. Working from the rear of the chassis, pivot the PCI card latch for the slot upward. See FIGURE 3-58**.**

b. If the PCI slot is empty, remove the filler panel from the server back panel opening.

c. Ensure that a PCI card riser is inserted in the PCI card slots.

The server is shipped with a PCI card riser in each of the two PCI slots.

d. Insert the PCI card into the riser. Ensure that the PCI card's rear connector panel engages the tab in the chassis rear panel.

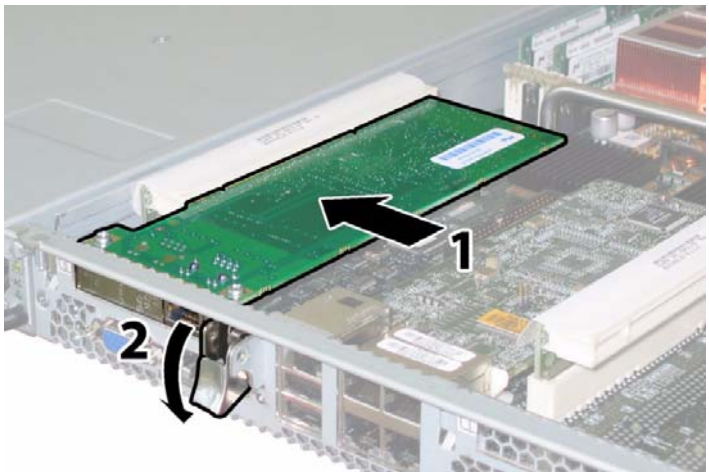


FIGURE 3-59 Installing a PCI Card

e. Pivot the PCI card latch downward until it locks. See FIGURE 3-59**.**

3.4.15 Replacing a Power Supply

Follow these steps to remove and replace a power supply.

Note – This component is a hot-swappable CRU and can be replaced by anyone.

TABLE 3-16 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-16 Sun Fire X4100 Supported Power Supply Part Numbers

Component	Part Number
Power supply (550W) (RoHS-compliant, replaces 300-1757)	300-1945

The internal system software designation of the two power supplies in the server is shown in FIGURE 3-60.

FIGURE 3-60 Sun Fire X4100 Designation of Power Supplies

1. **Identify which power supply you will replace. Each power supply has three LEDs that you can view from the rear of the server:**
   - Top LED is on (green): Power supply is operating properly.
   - Middle LED is on (amber): Power supply is faulty and should be replaced.
   - Bottom LED is on (green): AC power source to power supply is operating properly.
2. **Disconnect the AC power cord from the power supply that you are replacing.**

   The power supplies are hot-swappable, so you do not have to shut down the server or disconnect the second power supply.

Note – The Service Action Required LEDs on the front panel and back panel blink when a power supply is unplugged. See Section C.1, "External Status Indicator LEDs" on page C-1 for the LED locations and descriptions.

---

3. **Remove the power supply:**

   a. **Grasp the power supply handle and push the thumb latch toward the center of the power supply. See** FIGURE 3-61**.**

   b. **While continuing to push on the latch, use the handle to remove the power supply from the chassis.**

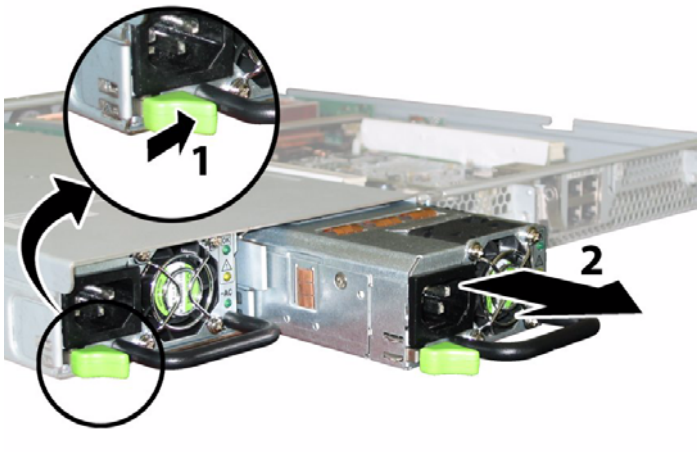


FIGURE 3-61 Removing a Power Supply

Installation is the reverse of this procedure.

Note – When installing a new power supply, press it into the bay until the thumb latch clicks, indicating that it is locked.

3.4.16 Replacing the Power Distribution Board

Follow these steps to remove and replace the power distribution board.

Note – This component is a FRU and should be replaced *only* by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 3-17 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 3-17 Sun Fire X4100 Supported Power Distribution Board Part Numbers

Component	Part Number
Power distribution board	501-6920

1. **Power off the server as described in Section 3.2.1, "Powering Off the Server" on page 3-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 3.2.2, "Removing the Main Cover" on page 3-3.**
4. **Remove the front bezel as described in Section 3.2.3, "Removing the Front Bezel" on page 3-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 3.2.4, "Removing the Front Cover" on page 3-5.**
6. **Remove both power supplies:**
   a. **Grasp the power supply handle and push the thumb latch toward the center of the power supply. See** FIGURE 3-62**.**
   b. **While continuing to push on the latch, use the handle to remove the power supply from the chassis.**

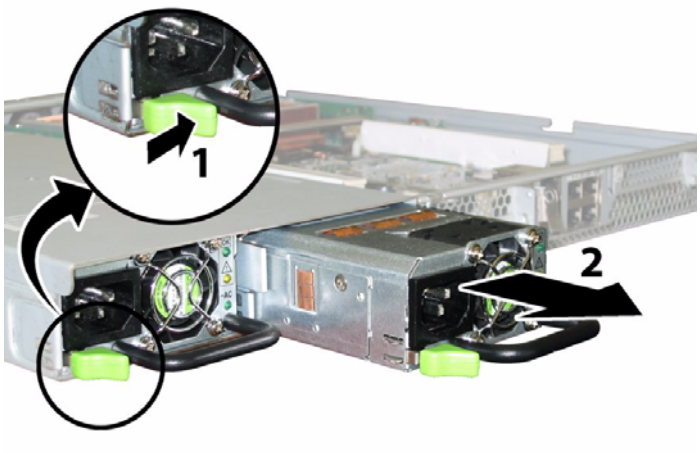


FIGURE 3-62 Removing a Power Supply

7. **Unfasten the spring-loaded thumbscrew that secures the flex cable retainer and remove this retainer from the chassis. See** FIGURE 3-63**.**

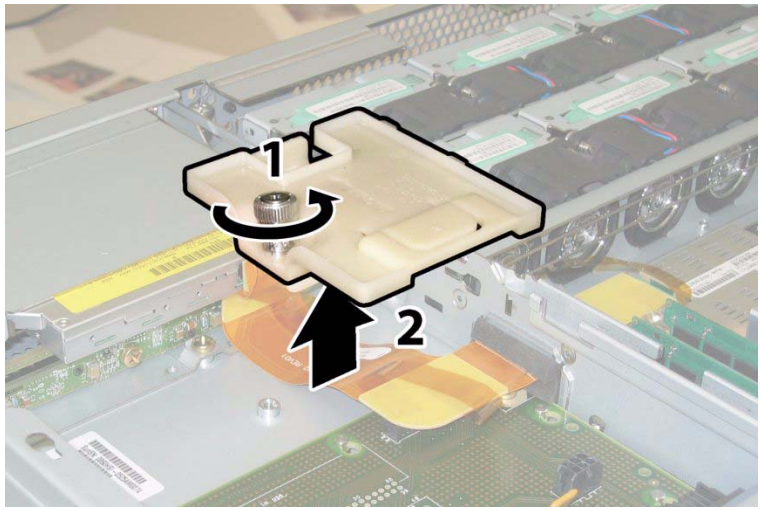


FIGURE 3-63 Removing the Flex Cable Retainer

8. **Remove the upper cable retainer from the chassis. Push the retainer toward the rear of the chassis to free it from the keyed openings in the chassis midwall. See** FIGURE 3-64**.**

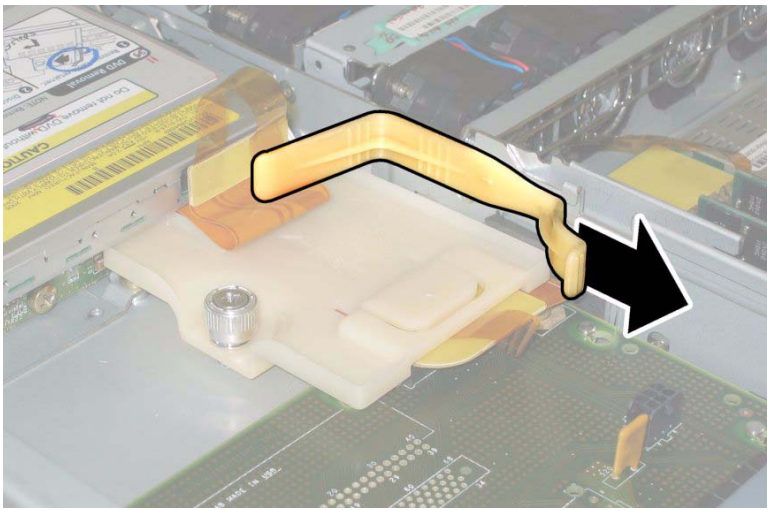


FIGURE 3-64 Removing the Upper Cable Retainer

9. **Remove the flex cable and its attached foam rubber gasket from the chassis midwall by disconnecting the cable's four connectors from the following four locations. See** FIGURE 3-65**.**

   1. DVD-ROM drive
   2. Hard disk drive backplane
   3. Power distribution board
   4. Motherboard

Note – When reinstalling the flex cable, attach the connector to the power distribution board (3) first. Then attach the remaining three connectors in any order.

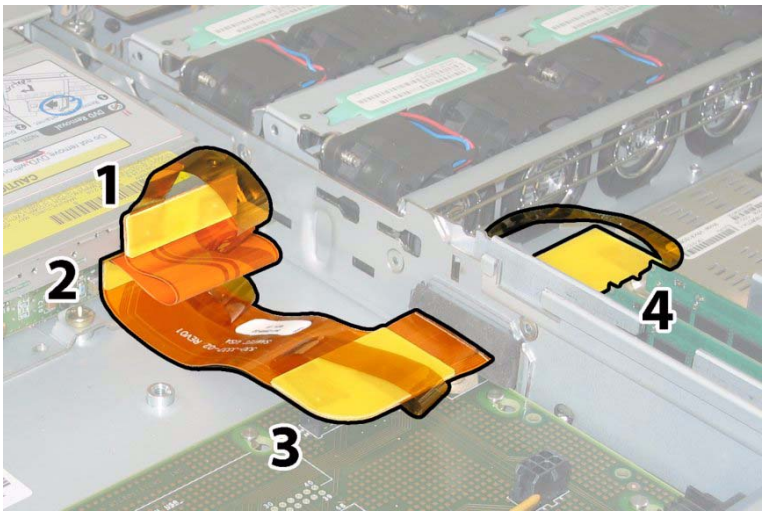


FIGURE 3-65 Disconnecting the Flex Cable's Four Connectors

10. **Use a No. 2 Phillips screwdriver to remove the three screws that secure the power distribution board to the chassis and bus bars. See** FIGURE 3-66**.**

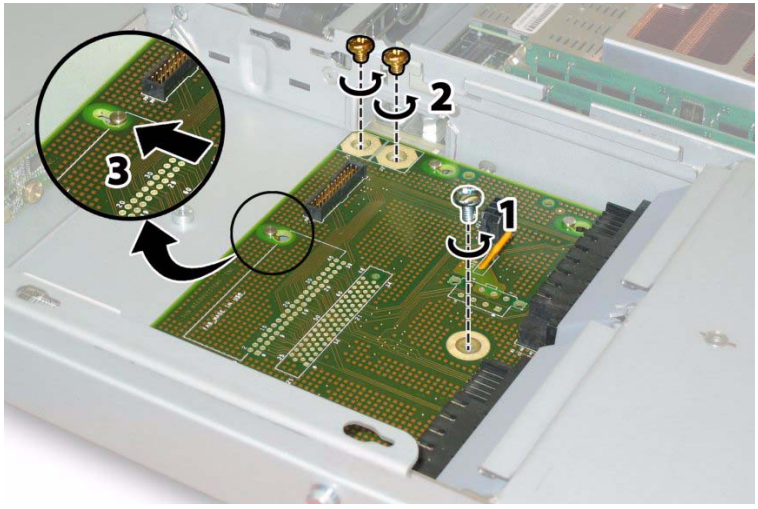


FIGURE 3-66 Unfastening the Power Distribution Board Screws

11. **Raise the plastic air baffles that cover the power supply connectors up and toward the rear of the chassis to provide clearance.**

12. **Slide the power distribution board toward the front of the chassis to release the five chassis standoffs from the keyways in the board.**

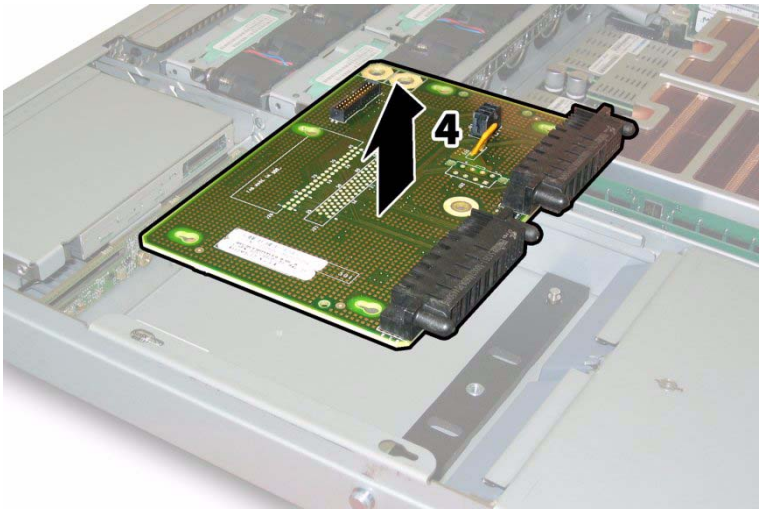


FIGURE 3-67 Removing the Power Distribution Board

13. **Lift the board up off of the chassis standoffs and remove it from the chassis.**

Installation is the reverse of this procedure.

Note – When you reinstall the power distribution board, ensure that the plastic air baffles on the chassis are fully raised to provide clearance for the rear of the board.

CHAPTER 4

Maintaining the Sun Fire X4200 Server

This chapter contains information and procedures for servicing the Sun Fire X4200 server hardware, including component removal and replacement procedures.

4.1 Tools and Supplies Needed

The Sun Fire X4200 server can be serviced with the following items:

- No. 2 Phillips screwdriver
- Antistatic wrist strap
- Ballpoint pen or other stylus (to press the recessed Power button)
- 8-mm nut-driver (for motherboard replacement)
- Long-nosed pliers (optional for Graphics Redirect and Service Processor (GRASP) board removal)

4.2 Powering Off and Removing the Covers

Use the preparatory procedures in this section when you are referred to them from the removal and replacement procedures.

4.2.1 Powering Off the Server

1. **Choose a method for shutting down the server from main power mode to standby power mode. See** FIGURE 4-1**.**
   - **Graceful shutdown:** Use a ballpoint pen or other stylus to press and release the recessed Power button on the front panel. This causes Advanced Configuration and Power Interface (ACPI) enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems will shut down to standby power mode immediately.
   - **Emergency shutdown:** Press and hold the Power button for four seconds to force main power off and enter standby power mode.

   When main power is off, the Power/OK LED on the front panel will begin flashing, indicating that the server is in standby power mode.

Caution – When you use the Power button to enter standby power mode, power is still directed to the GRASP board and power supply fans, indicated when the Power/OK LED is flashing. To completely power off the server, you must disconnect the AC power cords from the back panel of the server.

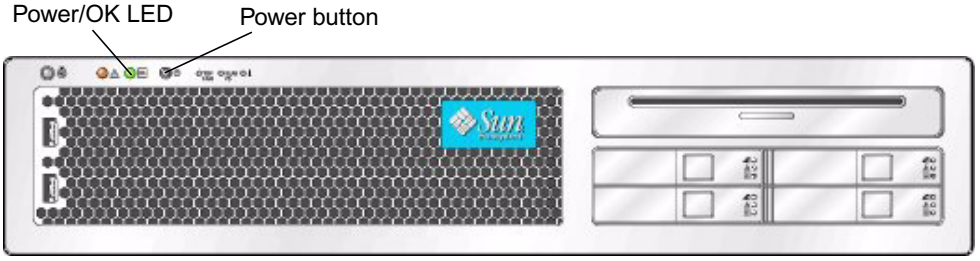


FIGURE 4-1 Power Button and Power/OK LED Location

2. **Unplug both power cords from the server's power supplies.**
3. **Turn off all peripheral devices connected to the system.**
4. **Label any peripheral cables and/or telecommunication lines that must be disconnected in order to remove and replace a specific component.**

4.2.2 Removing the Main Cover

Caution – Before handling components, attach an electrostatic discharge (ESD) wrist strap to the grounding post that is built into the rear of the chassis (see FIGURE 1-5 for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

1. **Press down on the cover release and, using the indent for leverage, slide the main cover toward the rear of the chassis approximately 0.5 inch (12 mm). See** FIGURE 4-2**.**
2. **Grasp the cover by its rear edge and lift it straight up from the chassis.**

Note – When you remove any cover, the intrusion switch that is on the front I/O board automatically powers down the system to standby mode.

FIGURE 4-2 Removing the Main Cover

4.2.3 Removing the Front Bezel

Remove the bezel from the front of the chassis by following these steps.

1. **Open the fan bay door and use a No. 2 Phillips screwdriver to unfasten the captive screw that locks the bezel in place. See** FIGURE 4-3**.**
2. **Pull the bezel away from the chassis.**

Note – Be careful to avoid bending the bezel by gradually pulling it from the middle and both ends simultaneously.

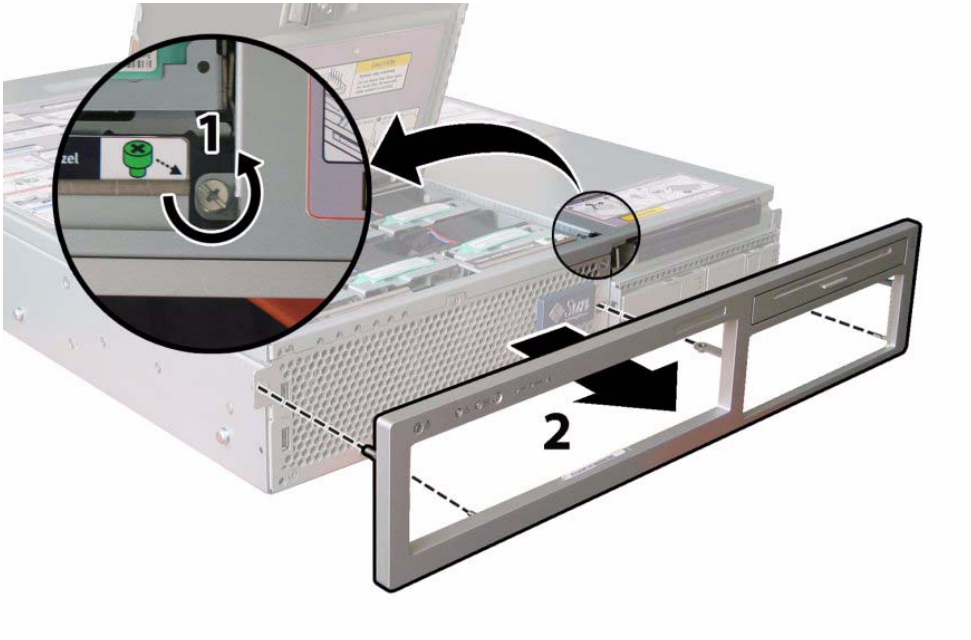


FIGURE 4-3 Unfastening the Front Bezel Locking Screw

4.2.4 Removing the Front Cover

1. **Open the door to the fan bay. See** FIGURE 4-4**.**
2. **While holding the fan bay door open, slide the front cover toward the front of the chassis approximately 0.25 inch (6 mm).**
3. **Raise the rear edge of the cover first and then lift it off of the chassis.**

Note – When you replace the front cover, place the front edge on the chassis first, then set it down into the keyed slots on the chassis sides before sliding it back.

Note – When you remove any cover, the intrusion switch that is on the front I/O board automatically powers down the system to standby power mode.

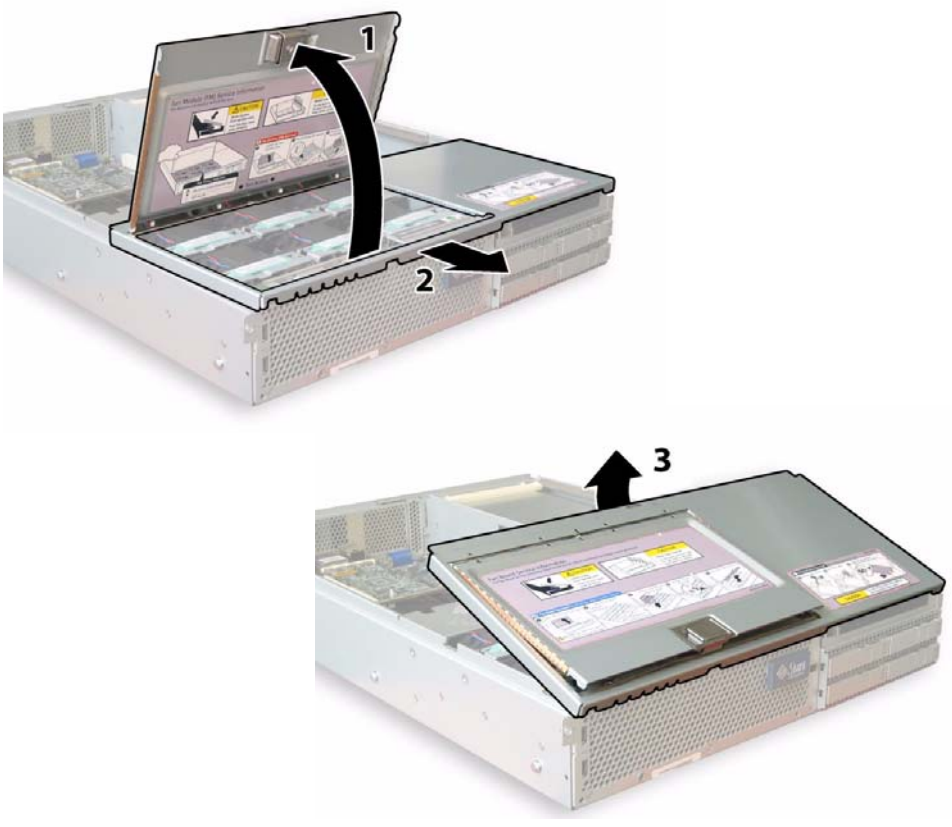


FIGURE 4-4 Removing the Front Cover

4.3 Locations of the Sun Fire X4200 Components

FIGURE 4-5 shows the locations of the replaceable Sun Fire X4200 components that are documented in this chapter.

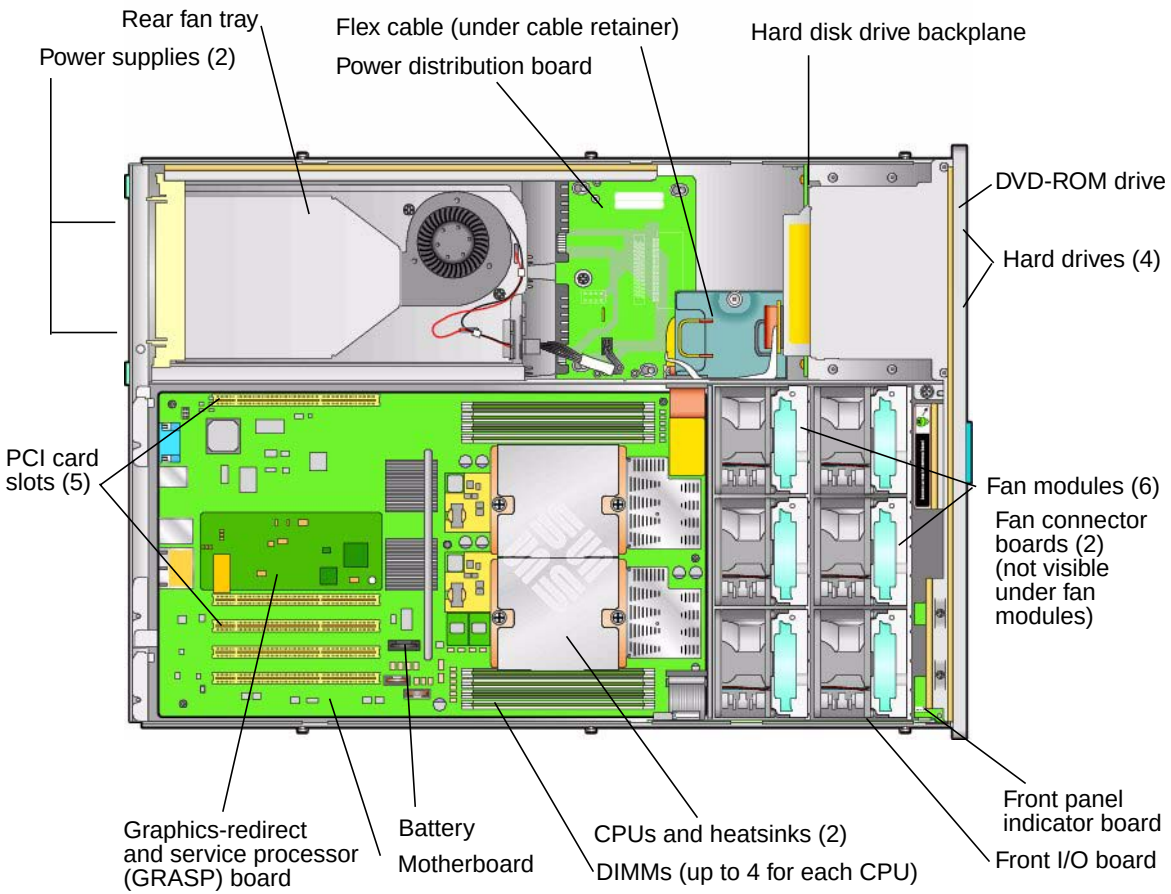


FIGURE 4-5 Sun Fire X4200 Replaceable Component Locations

4.4 Replaceable Component Procedures

Note – Some of the procedures in this section are for customer-replaceable units (CRUs) and some are for field-replaceable units (FRUs), as noted in the procedures and in the list below. FRU components should be replaced only by trained service technicians. Contact your Sun Service representative for assistance with FRU replacements.

This section contains procedures for replacing the following components:

- Section 4.4.1, "Replacing the Battery" on page 4-8 (CRU)
- Section 4.4.2, "Replacing a CPU and Heatsink" on page 4-10 (FRU)
- Section 4.4.3, "Replacing the DVD-ROM Drive" on page 4-17 (FRU)
- Section 4.4.4, "Installing a DVD-ROM Drive Upgrade Kit" on page 4-20 (FRU)
- Section 4.4.5, "Replacing a Fan Module" on page 4-25 (CRU)
- Section 4.4.6, "Replacing a Fan Connector Board" on page 4-27 (CRU)
- Section 4.4.8, "Replacing the Front I/O Board" on page 4-32 (CRU)
- Section 4.4.7, "Replacing the Front Panel Indicator Board" on page 4-30 (CRU)
- Section 4.4.9, "Replacing the Graphics Redirect and Service Processor (GRASP) Board" on page 4-38 (FRU)
- Section 4.4.10, "Replacing a Hard Disk Drive" on page 4-40 (CRU)
- Section 4.4.11, "Replacing a Hard Disk Drive Backplane" on page 4-43 (FRU)
- Section 4.4.12, "Replacing Memory Modules (DIMMs)" on page 4-48 (CRU)
- Section 4.4.13, "Replacing the Motherboard" on page 4-52 (FRU)
- Section 4.4.14, "Replacing PCI Cards" on page 4-61 (CRU)
- Section 4.4.15, "Replacing a Power Supply" on page 4-65 (CRU)
- Section 4.4.16, "Replacing the Power Distribution Board" on page 4-67 (FRU)
- Section 4.4.17, "Replacing the Rear Fan Tray" on page 4-72 (CRU)

Caution – Before handling components, attach an ESD wrist strap to the grounding post that is built into the rear of the chassis (see FIGURE 1-5 for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

4.4.1 Replacing the Battery

Follow these steps to remove and replace the system battery.

Note – This component is a CRU and can be replaced by anyone.

TABLE 4-1 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-1 Sun Fire X4100 Supported Battery Part Numbers

Component	Part Number
Battery, system	150-3993

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**

Note – Note the orientation (polarity) of the battery in its holder before it is removed. The positive polarity, marked with a "+" symbol, should be facing toward the chassis center.

---

4. **Remove the battery by gently pulling the clip away from the battery face and lifting the battery straight up. See** FIGURE 4-6**.**

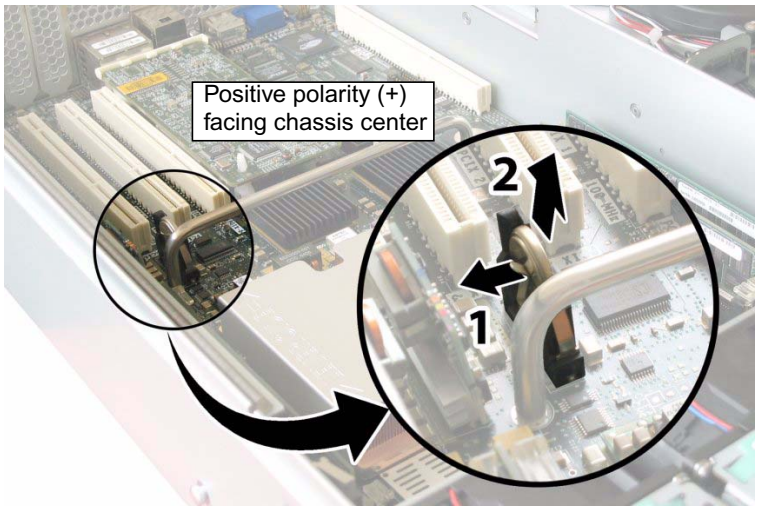


FIGURE 4-6 Removing the Battery

Installation is the reverse of this procedure.

Note – Install the new battery in the holder with the same orientation (polarity) as the battery that you removed. The positive polarity, marked with a "+" symbol, should be facing toward the chassis center.

4.4.2 Replacing a CPU and Heatsink

Follow these steps to remove and replace the a CPU and its heatsink.

Note – This component is a FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 4-2 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-2 Sun Fire X4200 Supported CPU Part Numbers

Component	Part Number
AMD 248 (2.2 GHZ) Opteron single-core CPU	370-7711
AMD 252 (2.6 GHZ) Opteron single-core CPU	370-7272
AMD 254 (2.8 GHZ) Opteron single-core CPU	370-7962
AMD 256 (3.0 GHz) Opteron single-core CPU	371-1776
AMD 270 (2.0 GHZ) Opteron dual-core CPU	370-7799
AMD 275 (2.2 GHZ) Opteron dual-core CPU	370-7800
AMD 280 (2.4 GHz) Opteron dual-core CPU * See the caution after this table.	370-7938
AMD 285 (2.6 GHz) Opteron dual-core CPU * See the caution after this table.	371-0856

Caution – Some AMD CPUs are released as Special Editions, which might differ in wattage from non-Special Edition versions of the CPU. Do not mix Special Edition CPUs with non-Special Edition versions. Always make sure that all CPUs in the server have the same part number.

---

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**

4. Identify which CPU and heatsink you are replacing.

The internal system software designation of the two CPUs in the server is shown in FIGURE 4-7. There is a fault LED on the motherboard for each CPU (see FIGURE 4-8 for the LED location):

- LED is off: CPU is OK.
- LED is lit (amber): CPU has encountered a voltage or heat error condition.

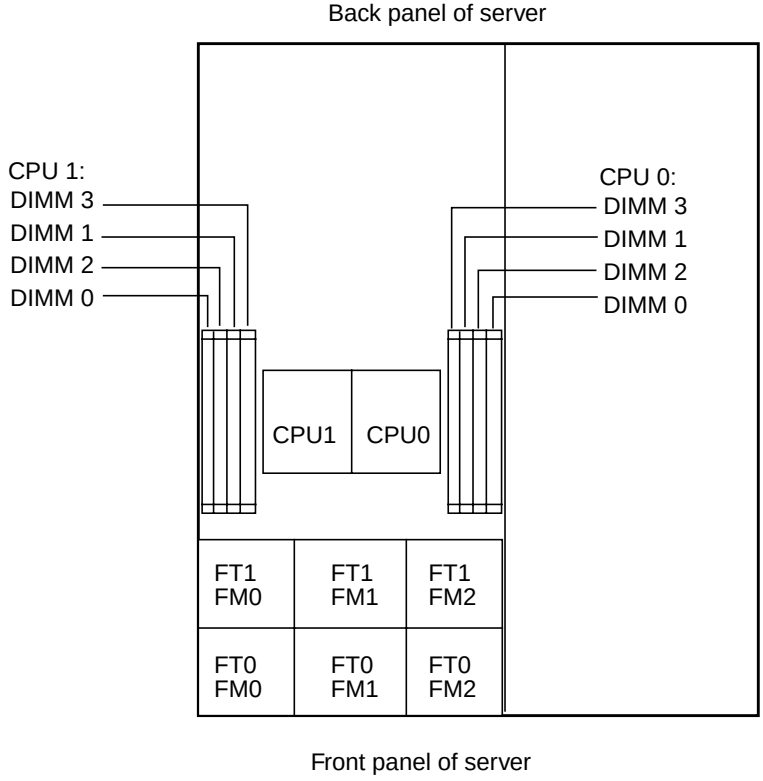


FIGURE 4-7 Sun Fire X4200 Designation of CPUs

5. **Remove the CPU and heatsink from the motherboard:**

   a. **Hold down on the top of the heatsink to prevent it from tipping unevenly while you alternately loosen the two spring-loaded mounting screws that secure the heatsink to the motherboard. Turn the screws 180-degrees at a time, then remove the screws when they are detached. See** FIGURE 4-8 **and** FIGURE 4-9**.**

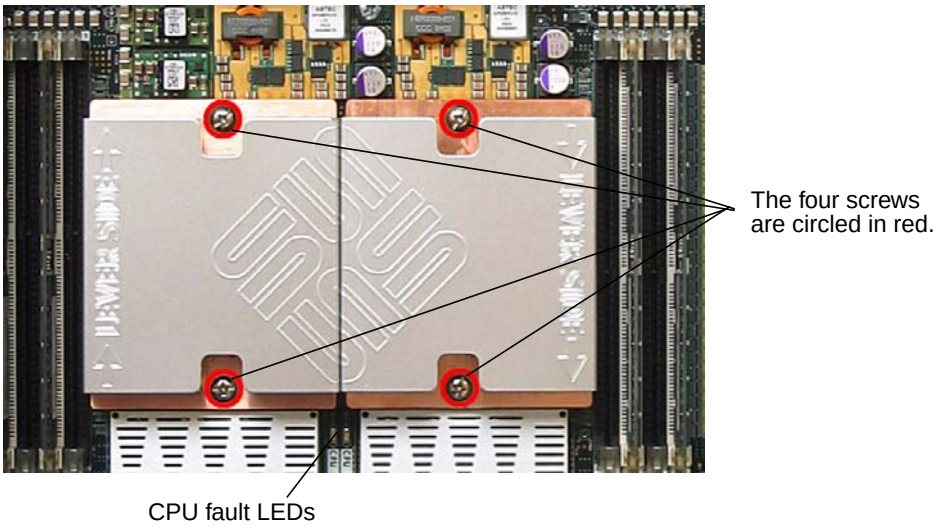


FIGURE 4-8 Location of the Heatsink Screws and CPU Fault LEDs

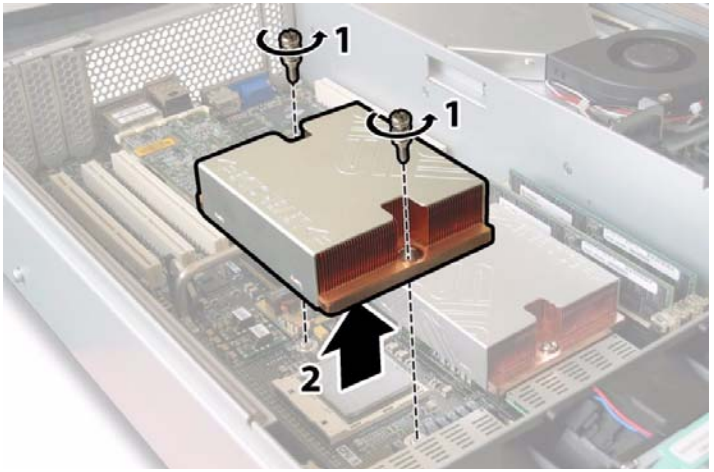


FIGURE 4-9 Removing the Heatsink

b. Twist the heatsink slightly to lift it off of the board. Turn the heatsink upside down and allow the spring in each of the two mounting holes to fall out into your hand.

Note – Set the heatsink upside down on a clean, flat surface to prevent the thermal grease from contaminating other components.

---

c. Pull the CPU socket lever slightly away from the socket. See FIGURE 4-10**.**

d. Pivot the lever up, into the fully open, vertical, position.

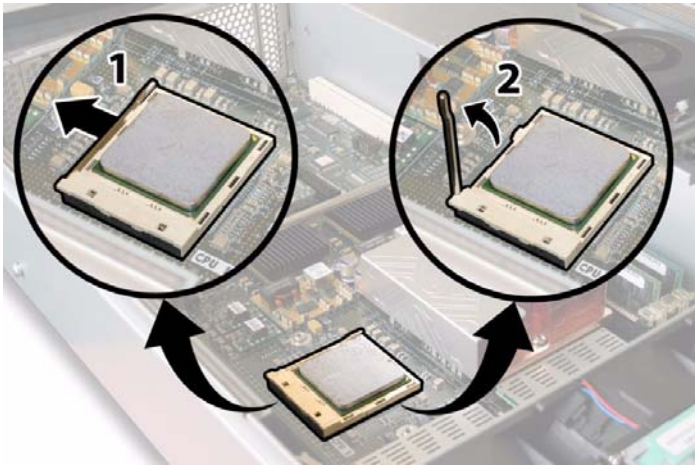


FIGURE 4-10 Releasing the CPU Socket Lever

e. Lift the CPU out of the socket, leaving the lever in the vertical, open position. See FIGURE 4-11**.**

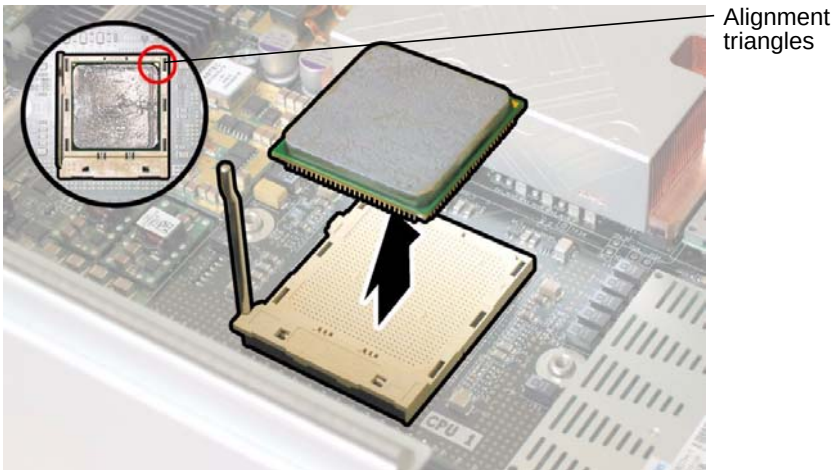


FIGURE 4-11 Removing the CPU From the Socket

6. **Install the new CPU and heatsink:**

Note – Mixing CPU speeds or mixing dual-core CPUs with single-core CPUs is not supported. Use two identical CPUs in your server.

---

a. Unpack the new CPU and heatsink.

b. Ensure that the CPU socket release lever is in the fully open, vertical position.

c. Align the CPU in the socket as shown in FIGURE 4-11**.**

Note – Align the triangle that is printed on one corner of the CPU with the tiny triangle that is imprinted on the CPU socket, as shown in the red circle in FIGURE 4-11.

Caution – The pins on the CPU are very fragile. If the CPU is correctly aligned, it will enter the CPU socket with little or no resistance. If you feel more than minimal resistance, stop and recheck the alignment. Forcing a misaligned CPU into the CPU socket could damage both devices.

---

d. Gently insert the CPU pins into the socket.

e. When the CPU is fully seated in the socket, pivot the release lever down and into the locked position, at the side of the socket.

f. If you are reinstalling an existing CPU or heatsink, use an alcohol pad to clean all old thermal grease from the component surface.

Caution – Ensure that the thermal grease in the syringe supplied with the CPU is pliable and not stiff. If your syringe of grease has aged, the grease might be too stiff to adequately spread out and ensure thermal conductance.

g. Use one syringe of thermal grease (one ml) to carefully apply grease to the top of the CPU in three lines in the pattern shown in FIGURE 4-12**.**

Note – Two syringes of thermal grease are supplied with the new CPU, but use only one syringe for each CPU. Apply the grease in the pattern shown in FIGURE 4-12.

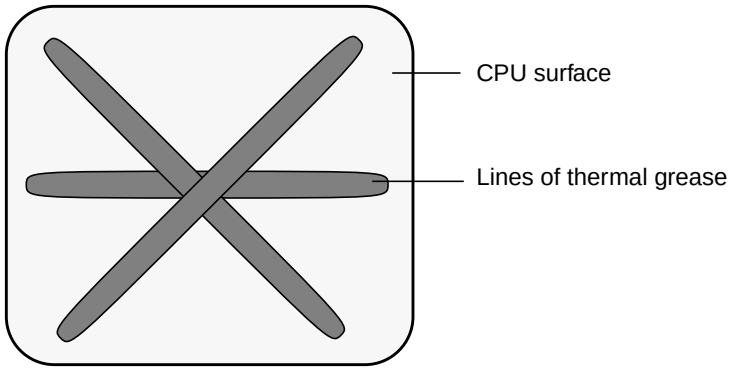


FIGURE 4-12 Required Pattern for Thermal Grease Application

7. Turn the heatsink upright and reinstall the two springs and mounting bolts.

Caution – Avoid moving the heatsink after it has contacted the top of the CPU. Too much movement could disturb the layer of thermal grease, leading to component damage.

8. Carefully position and align the heatsink over the CPU.

Note – The heatsink is not symmetrical and it must be aligned before you place it on the CPU. Turn the heatsink so that the "Lever Side" label and arrows imprinted on the top of the heatsink are pointing to the side of the CPU socket that has the release lever. Also note that the half of the Sun Microsystems logo imprinted on the top of the heatsink will create a complete logo when correctly aligned with the adjacent heatsink. See FIGURE 4-8.

9. **Lower the heatsink onto the CPU, aligning the mounting bolts with their holes on the motherboard.**
10. **Alternately tighten the two heatsink mounting screws 180-degrees at a time until each spring is completely compressed.**

4.4.3 Replacing the DVD-ROM Drive

- Follow these steps to remove and replace the DVD-ROM drive.
- If you are installing a DVD-ROM upgrade kit to a system that previously did not have a DVD-ROM drive, see Section 4.4.4, "Installing a DVD-ROM Drive Upgrade Kit" on page 4-20.

Note – This component is a FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 4-3 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-3 Sun Fire X4200 Supported DVD-ROM Drive Part Numbers

Component	Part Number
Slim-slot DVD-ROM drive (RoHS-compliant, replaces 540-6368)	390-0320

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**
4. **Remove the front bezel as described in Section 4.2.3, "Removing the Front Bezel" on page 4-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 4.2.4, "Removing the Front Cover" on page 4-5.**
6. **Remove the upper cable retainer from the chassis midwall. See** FIGURE 4-13**.**

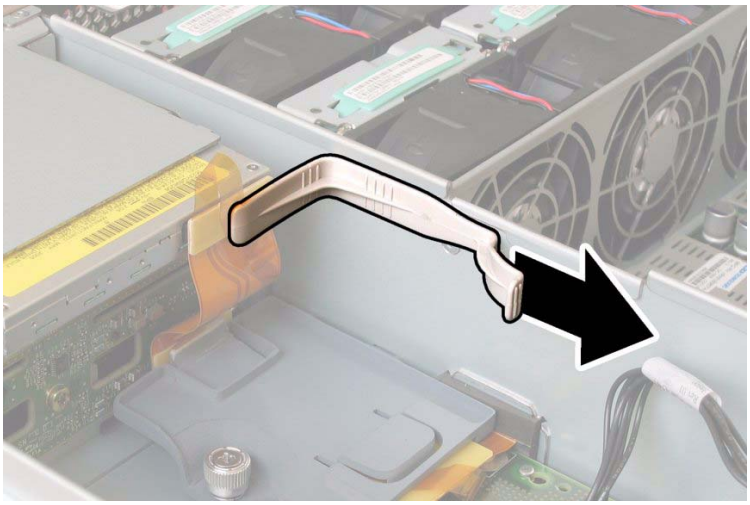


FIGURE 4-13 Removing the Cable Retainer

7. **Disconnect the flex cable connector from the rear of the DVD-ROM drive. See** FIGURE 4-14**.**

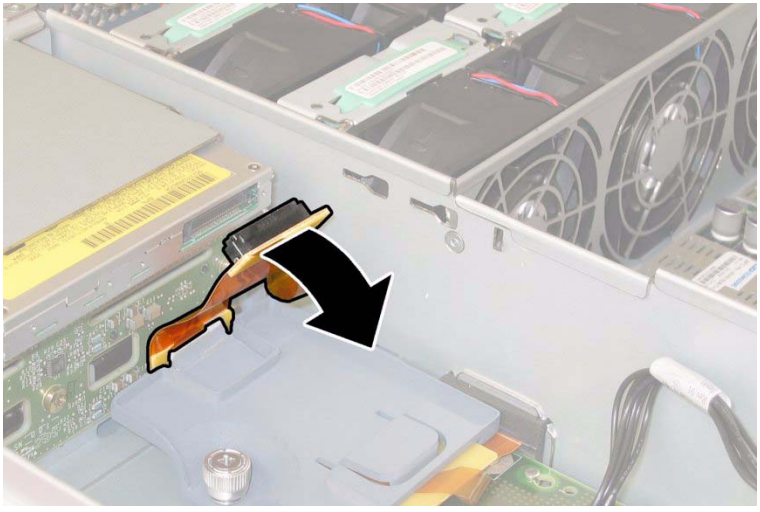


FIGURE 4-14 Releasing the DVD-ROM Drive Flex Cable Connector

8. **Pull the spring latch at the front of the DVD-ROM drive to the left and hold it. Use your other hand to reach behind the drive and push it out through the front of the chassis. See** FIGURE 4-15**.**

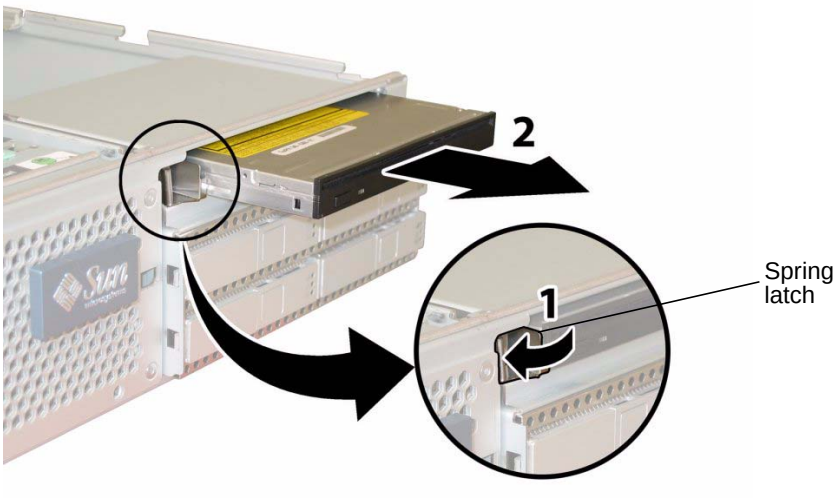


FIGURE 4-15 Removing the DVD-ROM Drive

Installation is the reverse of this procedure.

4.4.4 Installing a DVD-ROM Drive Upgrade Kit

- Follow these steps to install a DVD-ROM upgrade kit to a system that previously did not have a DVD-ROM drive.
- If you are removing and replacing an existing DVD-ROM drive, see Section 4.4.3, "Replacing the DVD-ROM Drive" on page 4-17.

Note – This component is a FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 4-3 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-4 Sun Fire X4200 Supported DVD-ROM Upgrade Kit Part Numbers

Component	Part Number
DVD-ROM Upgrade Kit	X8030A-Z

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**
4. **Remove the front bezel as described in Section 4.2.3, "Removing the Front Bezel" on page 4-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 4.2.4, "Removing the Front Cover" on page 4-5.**

6. **Install the DVD-slot faceplate to the front bezel. See** FIGURE 4-16**:**

   a. **Lay the bezel face-down on a work surface.**

   b. **Use a No. 2 Phillips screwdriver to remove the two screws that secure the blank filler panel to the bezel. Save the screws in a safe place because you will reinstall them in a following step.**

   c. **Remove the blank filler panel and set it aside.**

   d. **Set the new DVD-slot faceplate in place in the bezel opening.**

      Ensure that the ejector button on the faceplate is oriented toward the bottom of the bezel.

   e. **Use a No. 2 Phillips screwdriver to install the two screws that secure the faceplate to the bezel.**

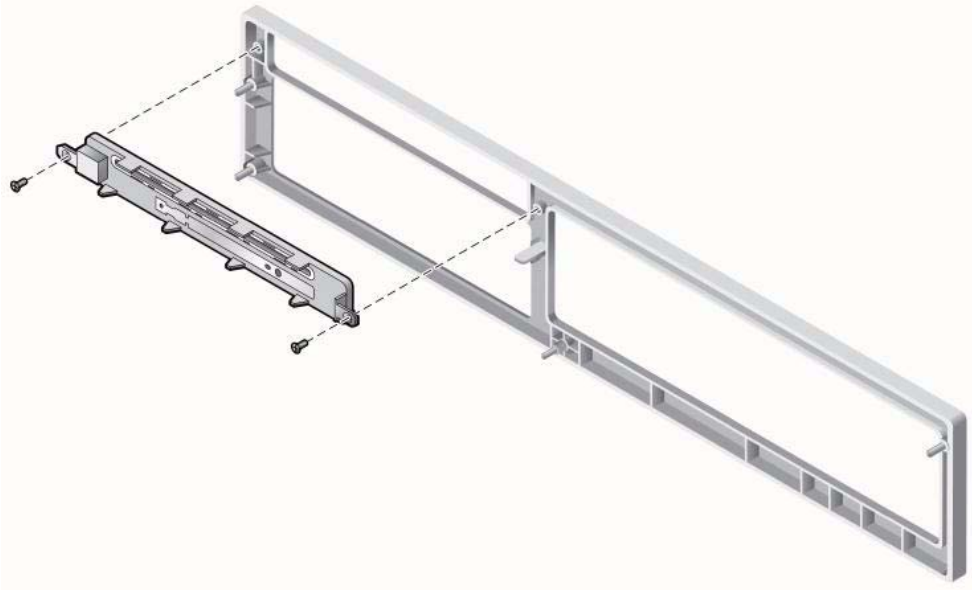


FIGURE 4-16 Installing the DVD-Slot Faceplate to the Front Bezel

7. **Install the DVD-ROM drive into the chassis. See** FIGURE 4-17**:**

   a. **Align the rear of the DVD-ROM drive with the opening in the chassis.**

   b. **Push the DVD-ROM drive into the chassis until the spring latch on the chassis closes over the front corner of the drive.**

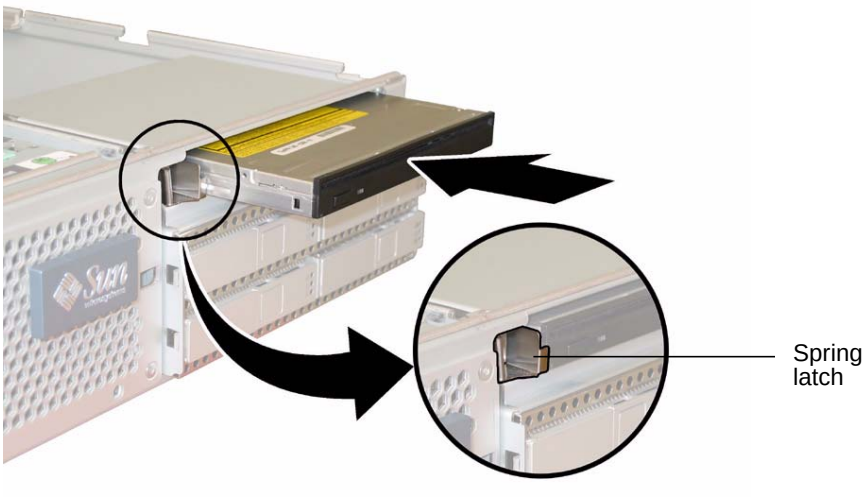


FIGURE 4-17 Installing the DVD-ROM Drive

8. **Connect the unused flex cable connector to the rear of the DVD-ROM drive. See** FIGURE 4-18**.**

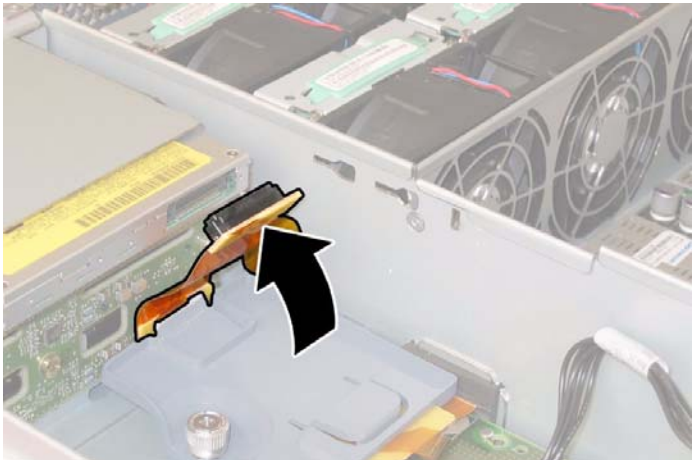


FIGURE 4-18 Connecting the DVD-ROM Drive Flex Cable Connector

9. **Install the upper cable retainer to the chassis midwall. See** FIGURE 4-19**:**

   a. **Insert the two pegs on the cable retainer into the two holes in the chassis midwall.**

   b. **Slide the cable retainer forward until it is locked in place and it is holding the flex cable connector firmly against the rear of the DVD-ROM drive.**

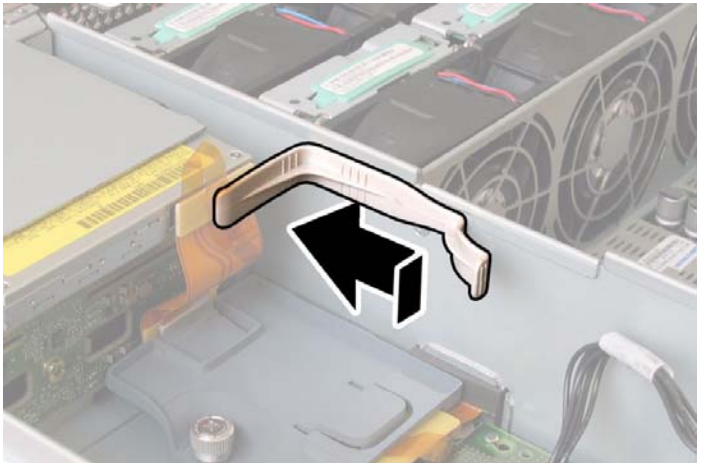


FIGURE 4-19 Installing the Cable Retainer

10. **Replace the front cover to the chassis. See** FIGURE 4-4**.**

    a. **Place the front edge of the cover squarely onto the chassis top-front edge.**

    b. **Set the rear of the cover down so that it fits into the keyed slots on the chassis sides.**

    c. **Slide the cover toward the rear of the chassis to lock it in place.**

Caution – Ensure that the front edge of the cover is seated tightly and squarely against the gasket on the top-front edge of the chassis to avoid overheating the server.

11. **Replace the front bezel to the chassis:**

    a. **Align the pegs on the rear of the bezel with the corresponding holes in the front of the chassis.**

    Note – Ensure that the new DVD-slot faceplate is over the DVD-ROM drive and that the button on the DVD-slot faceplate is oriented toward the chassis bottom. See FIGURE 4-1.

    ---

    b. **Press the bezel evenly against the front of the chassis until it is flat against the front of the chassis.**

    c. **Open the fan bay door on the front cover and tighten the captive retaining screw that secures the bezel in place. See** FIGURE 4-3**.**

12. **Replace the main cover to the chassis:**

    a. **Set the cover in place so that it aligns with the keyed openings in the chassis sides.**

    b. **Slide the cover toward the chassis front until it is firmly and squarely against the edge of the front cover.**

13. **Return power to the server. See** **Section 2.1, "Powering On the Server" on page 2-2.**

4.4.5 Replacing a Fan Module

Follow these steps to remove and replace an individual fan module.

Note – This component is a hot-swappable CRU and can be replaced by anyone.

TABLE 4-5 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-5 Sun Fire X4200 Supported Fan Module Part Numbers

Component	Part Number
Fan tray assembly (Sun Fire X4200 fan module)	541-0269

Caution – The fans are hot-swappable and can be removed and replaced while the system is running. Do not hold the fan bay door open for more than 60 seconds at a time to avoid overheating the server. Remove and replace only one fan at a time.

The internal system software designation of the fan connector boards, or fan trays (FT), and fan modules (FM) is shown in FIGURE 4-20 (viewed from the front of the server).

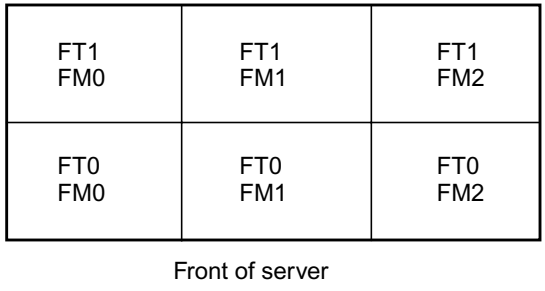


FIGURE 4-20 System Designation of Fan Connector Boards and Fan Modules

1. **If the server is in a rack, slide it far enough from the rack so that you can open the fan bay door. If you cannot safely view and access the component, remove the server from the rack.**

2. **Open the door to the fan bay and identify the defective fan module(s).**
   - Fan module LED lit: The fan module is faulty and should be replaced.
   - Fan module LED off: The fan module is operating properly.

Caution – When you open the fan bay door, be careful to hold it open with one hand so that it does not spring shut and injure your fingers. Do not hold the fan bay door open for more than 60 seconds while the server is running to avoid overheating the server.

---

3. **While holding the fan bay door open, grasp the faulty fan module by its plastic strap and lift it straight up out of the fan bay. See** FIGURE 4-21**.**

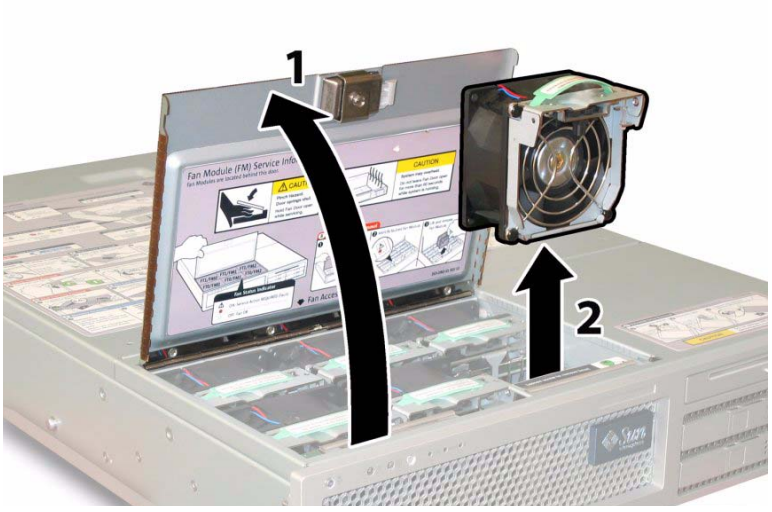


FIGURE 4-21 Opening the Fan Bay Door and Removing a Fan Module

Installation is the reverse of this procedure.

4.4.6 Replacing a Fan Connector Board

Follow these steps to remove and replace a fan connector board.

Note – This component is a CRU and can be replaced by anyone.

TABLE 4-6 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-6 Sun Fire X4200 Supported Fan Connector Board Part Numbers

Component	Part Number
Fan connector board	501-6917

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can open the fan bay door. If you cannot safely view and access the component, remove the server from the rack.**

Caution – When you open the fan bay door, be careful to hold it open with one hand so that it does not spring shut and injure your fingers. Do not hold the fan bay door open for more than 60 seconds while the server is running to avoid overheating the server.

---

3. **Open the fan bay door and hold it open. See** FIGURE 4-22**.**

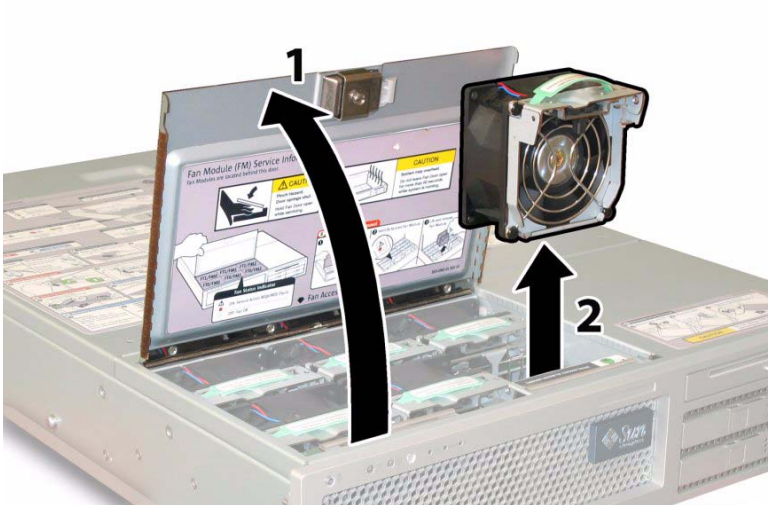


FIGURE 4-22 Opening the Fan Bay Door and Removing a Fan Module

4. **Remove the three fan modules that are connected to the fan connector board that you are replacing. Grasp each fan module by its plastic strap and lift it straight up out of the fan bay.**

5. **Unfasten the single screw that secures the fan connector board to the chassis. See** FIGURE 4-23**.**

Note – In the following figures, the server is shown from a rear view with the front cover off and all fans removed to provide visibility. Do not remove the covers for this procedure.

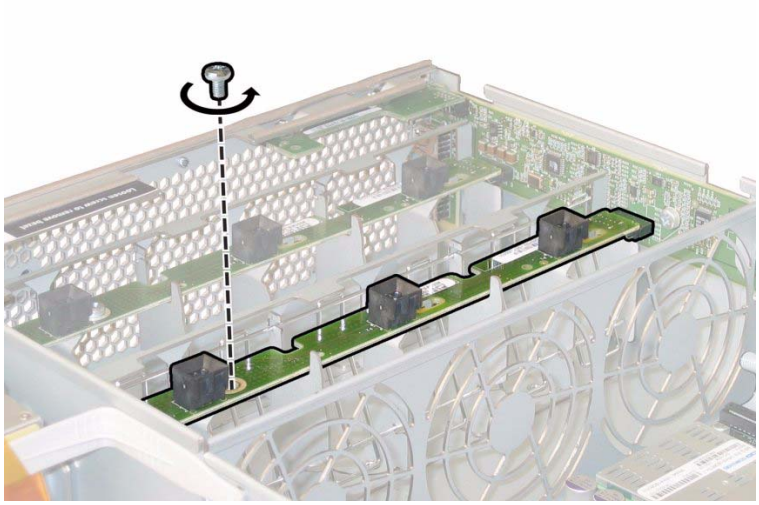


FIGURE 4-23 Unfastening the Fan Connector Board Securing Screw

6. **Slide the fan connector board toward the center of the chassis to disconnect it from the front I/O board and to release it from the two locating tabs on the chassis. See** FIGURE 4-24**.**
7. **Lift the board straight up to remove it from the system.**

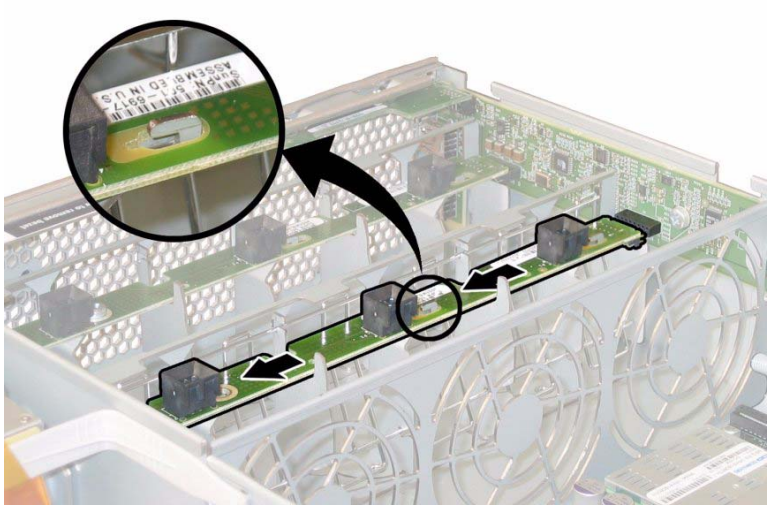


FIGURE 4-24 Releasing the Fan Connector Board

Installation is the reverse of this procedure.

4.4.7 Replacing the Front Panel Indicator Board

Follow these steps to remove and replace a front panel indicator board.

Note – This component is a CRU and can be replaced by anyone.

TABLE 4-7 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-7 Sun Fire X4200 Supported Front Panel Indicator Board Part Numbers

Component	Part Number
Indicator board (front panel)	501-6916

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**
4. **Remove the front bezel as described in Section 4.2.3, "Removing the Front Bezel" on page 4-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 4.2.4, "Removing the Front Cover" on page 4-5.**
6. **Unfasten the two screws that secure the front panel indicator board to the chassis.**

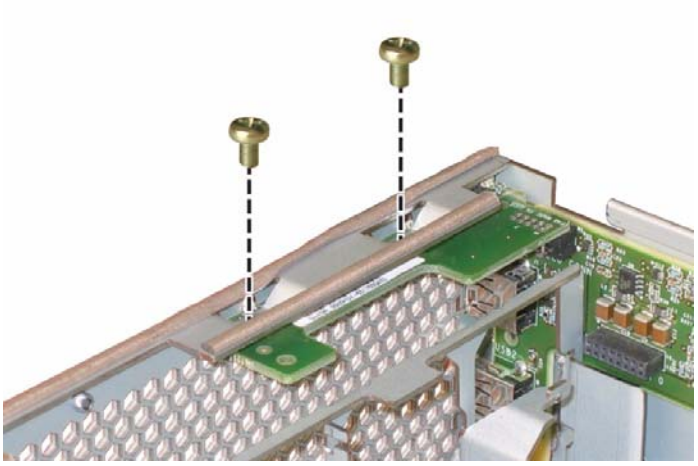


FIGURE 4-25 Unfastening the Front Panel Indicator Board Screws

7. **While supporting the indicator board with your right hand, use your left hand to gently push the indicator board toward the center of the chassis to disconnect it from the front I/O board. See** FIGURE 4-26**.**

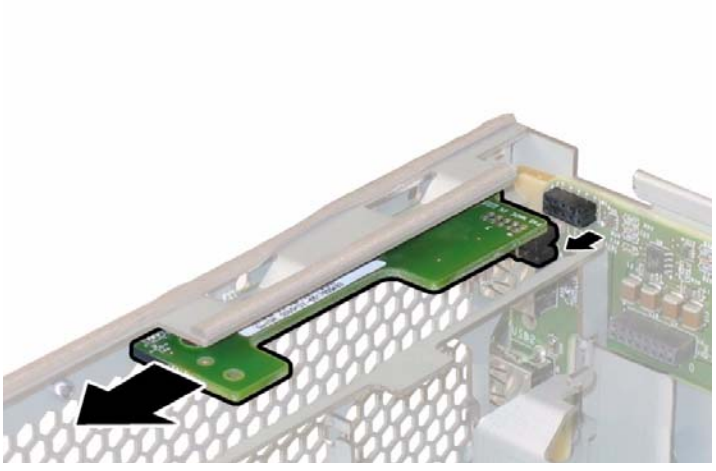


FIGURE 4-26 Removing the Front Panel Indicator Board

8. **Remove the front panel indicator board from the chassis.**

   Installation is the reverse of this procedure.

4.4.8 Replacing the Front I/O Board

Follow these steps to remove and replace the front I/O board.

Note – This component is a FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 4-8 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-8 Sun Fire X4200 Supported Front I/O Board Part Numbers

Component	Part Number
Front I/O board (for Sun Fire X4200)	501-6978

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**
4. **Remove the front bezel as described in Section 4.2.3, "Removing the Front Bezel" on page 4-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 4.2.4, "Removing the Front Cover" on page 4-5.**
6. **Remove all six fan modules by lifting each fan module by its plastic strap to disconnect it from its fan connector board.**
7. **Remove both the fan connector boards:**
   a. **Unfasten the single screw that secures each fan connector board to the chassis. See** FIGURE 4-27**.**

Note – In the following figures, the server is shown from a rear view with the front cover off and all fans removed to provide visibility.

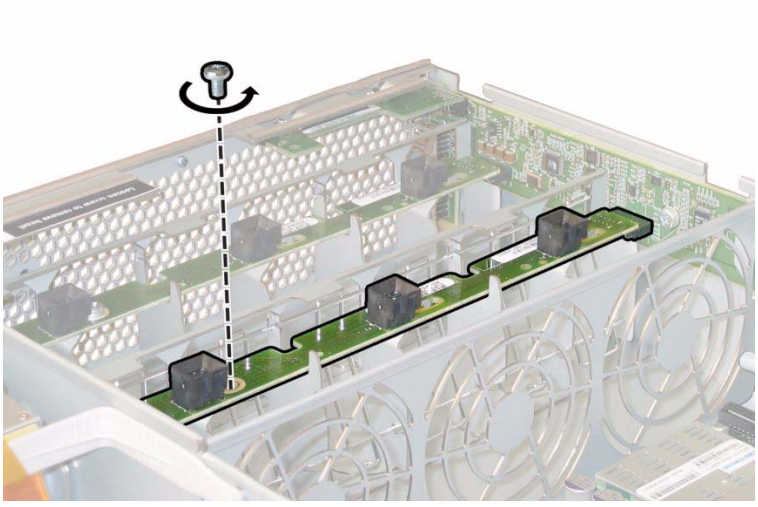


FIGURE 4-27 Unfastening the Fan Connector Board Securing Screw

b. Slide each fan connector board toward the center of the chassis, to disconnect them from the front I/O board and to release each board from the locating tabs on the chassis. See FIGURE 4-28**.**

c. Lift the fan connector boards straight up to remove them from the system.

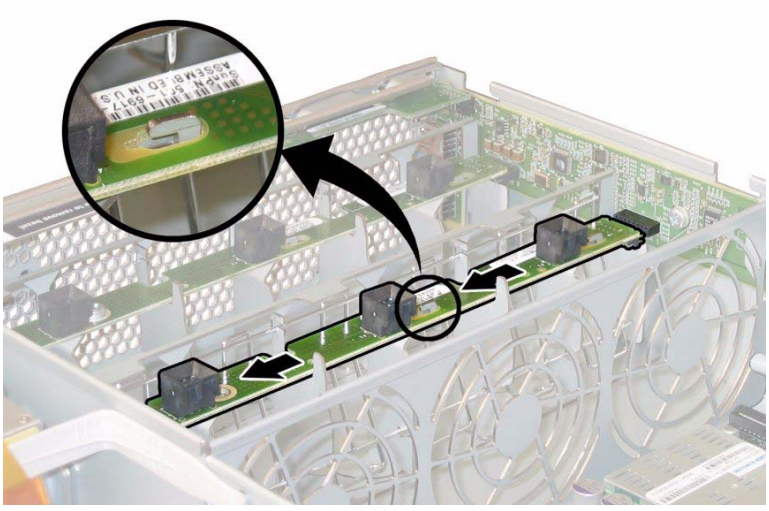


FIGURE 4-28 Releasing the Fan Connector Board

8. **Remove the front panel indicator board:**

   a. **Unfasten the two screws securing the front panel indicator board to the chassis. See** FIGURE 4-29**.**

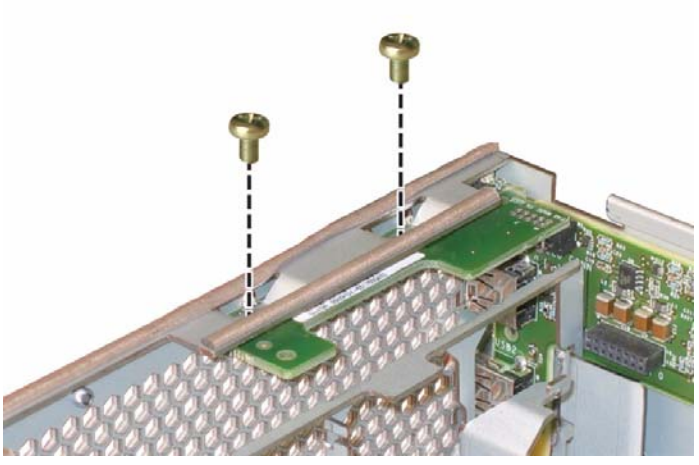


FIGURE 4-29 Unfastening the Front Panel Indicator Board Screws

   b. **While supporting the indicator board with your right hand, use your left hand to gently push the indicator board toward the center of the chassis to disconnect it from the front I/O board. See** FIGURE 4-30**.**

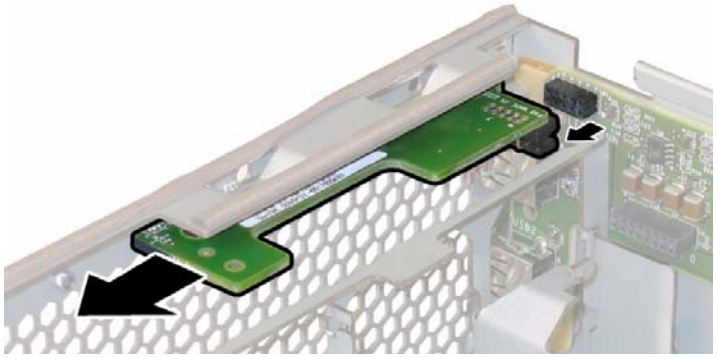


FIGURE 4-30 Removing the Front Panel Indicator Board

c. Remove the indicator board from the chassis.

9. **Disconnect any external cables from the front I/O board's USB connectors.**
10. **Disconnect the front I/O interconnect cable that connects the front I/O board to the motherboard. See** FIGURE 4-31**.**

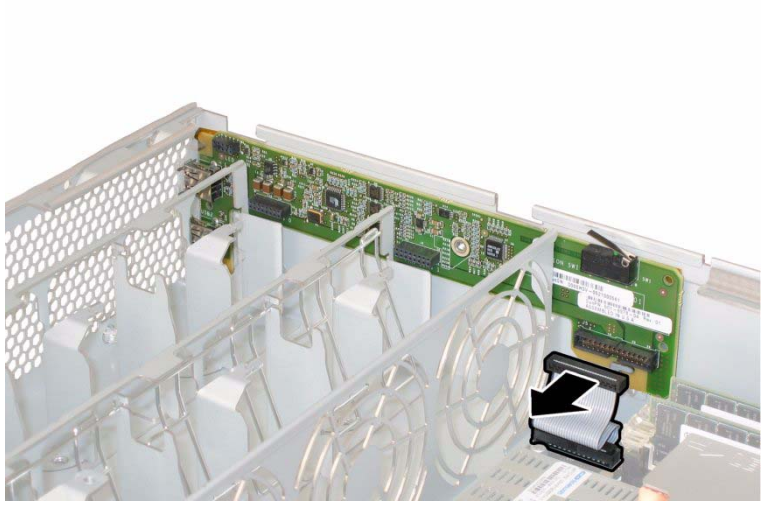


FIGURE 4-31 Disconnecting the Interconnect Cable From the Front I/O Board

11. **Unfasten the screw that secures the front I/O board to the chassis. See** FIGURE 4-32**.**

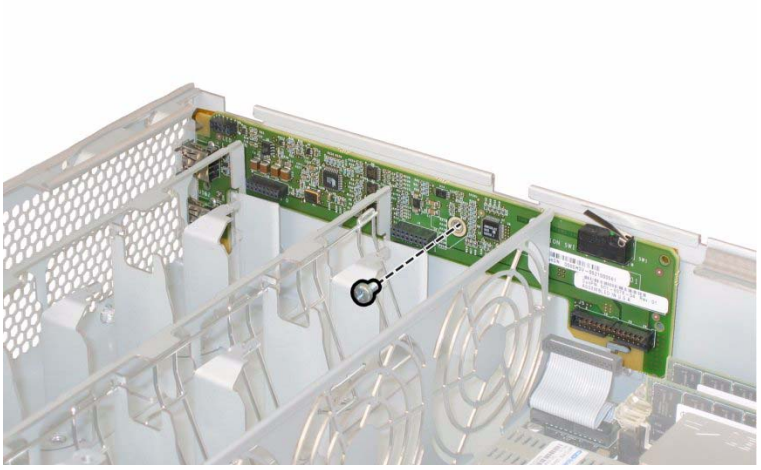


FIGURE 4-32 Unfastening the Front I/O Board Screw From the Chassis

---

Note – The white plastic sheath that is attached to the front I/O board is an insulator, which protects the board components. Do not remove this insulator sheath from the front I/O board.

---

12. **Gently push the front I/O board toward the rear of the chassis approximately 0.25 inch (6 mm), freeing the board from the two locating tabs at its bottom-left and bottom-right corners. See** FIGURE 4-33**.**

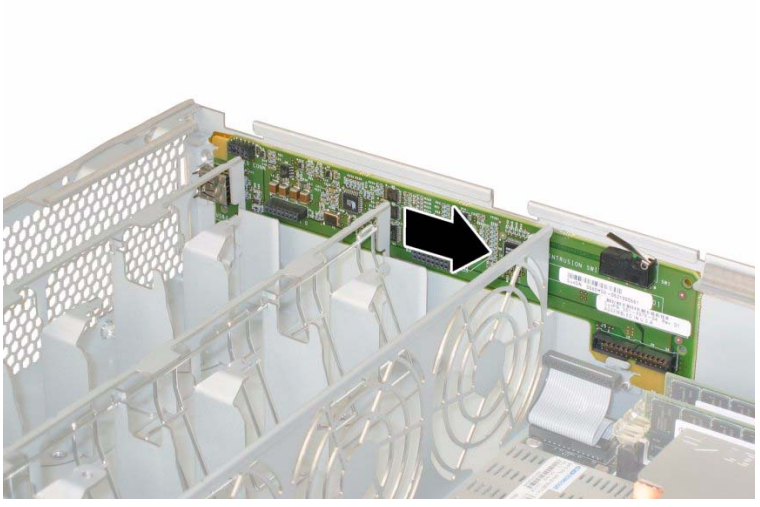


FIGURE 4-33 Releasing the Front I/O Board From the Chassis Locating Tabs

13. **Lift the front I/O board straight up and out of the chassis.**

    Installation is the reverse of this procedure.

4.4.9 Replacing the Graphics Redirect and Service Processor (GRASP) Board

Follow these steps to remove and replace the Graphics Redirect and Service Processor (GRASP) board.

Note – This component is a FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 4-9 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-9 Sun Fire X4200 Supported GRASP Board Part Numbers

Component	Part Number
GRASP board	501-6979

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**

Caution – There is a power status LED (CR1) on the GRASP board that indicates whether 3.3V standby power is reaching the GRASP board. The GRASP board is not hot-swappable and should never be removed while this LED is lit.

---

4. **Squeeze the plastic standoff that protrudes through the GRASP board to press the standoff's locking tabs. See** FIGURE 4-34**.**

   If you have difficulty pressing the locking tabs with your fingers, you can use a pair of long-nosed pliers.

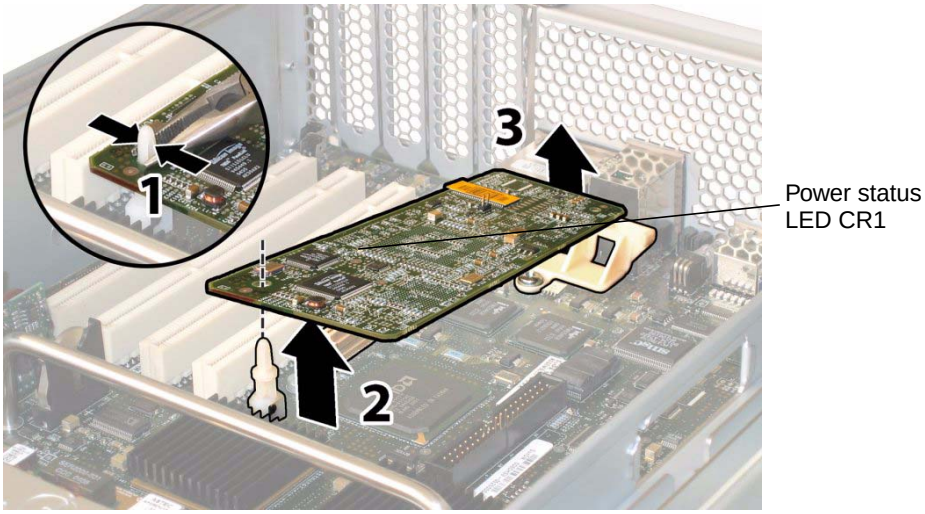


FIGURE 4-34 Removing the GRASP Board

5. **Raise the corner of the GRASP board until it is clear of the locking tab.**
6. **Pivot the front edge of the GRASP board upward to disengage it from the rear plastic bracket and to disengage its connector from the motherboard.**

Note – Be careful to avoid bending the GRASP board while removing or installing it.

Installation is the reverse of this procedure.

4.4.10 Replacing a Hard Disk Drive

Follow these steps to remove and replace a hard disk drive (HDD).

Note – This component is a hot-swappable CRU and can be replaced by anyone.

The internal system software designation of the HDDs is shown in FIGURE 4-20.

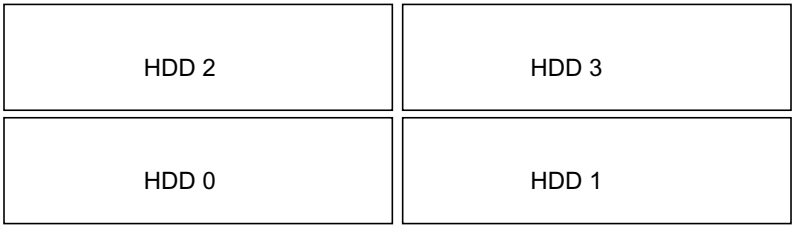


FIGURE 4-35 Sun Fire X4200 Designation of Hard Disk Drives

A single HDD failure will not cause a data failure if the HDDs are configured as a mirrored RAID 1 volume (optional). The HDD can be hot-swapped, and when a new HDD is inserted, the contents are automatically rebuilt from the rest of the array with no need to reconfigure the RAID parameters. If the bad HDD was configured as a hot-spare, the new HDD is automatically configured as a new hot-spare to mirror the data from the good HDD.

Caution – Possible data loss: If you insert a HDD that has been configured with a RAID volume into a server that did not previously have its HDDs configured with RAID volumes, the existing HDD(s) in the server will be converted to RAID volumes during automatic synchronization and any existing data on the existing HDD(s) in the server will be erased. Before permanently removing a HDD that is part of an active RAID volume, use the LSI Configuration Utility to delete the RAID volume from the HDD to avoid causing this problem.

For information about the implementation of RAID on this server and instructions on how to use the LSI Logic Fusion-MPT Serial Attached SCSI (SAS) BIOS Configuration Utility to configure RAID for your server, see Section E.4, "Performing RAID Configuration Tasks" on page E-41.

TABLE 4-10 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-10 Sun Fire X4200 Supported HDD Part Numbers

Component	Part Number
36-GB 10K RPM 2.5-inch SAS drive (RoHS-compliant, replaces 540-6358)	540-6610
73-GB 10K RPM 2.5-inch SAS drive (RoHS-compliant, replaces 541-0323)	540-6611

1. **Observe the LEDs on the faces of the HDDs and identify the defective HDD:**
   - Middle LED on (amber): The drive is faulty and should be replaced.
   - Bottom LED on (green): The drive is operating properly.

Note – When you replace the HDDs to their bays, you must return each HDD to the bay from which it was removed. Use an adhesive note or another method to temporarily label the HDDs when you remove them.

---

2. **Press the button on the face of the HDD to release the spring-loaded securing latch. See** FIGURE 4-36**.**
3. **Grasp the securing latch and remove the HDD from the drive bay.**

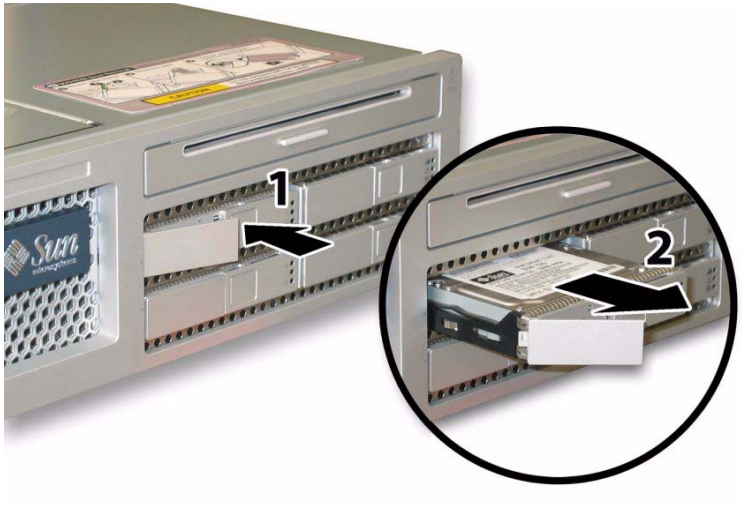


FIGURE 4-36 Opening the Hard Disk Drive Latch

Installation is the reverse of this procedure.

Note – If the HDDs were previously configured as a mirrored RAID 1 array, an automatic resynchronization is invoked and the contents are automatically rebuilt from the rest of the array with no need to reconfigure the RAID parameters. If the bad HDD was configured as a hot-spare, the new HDD is automatically configured as a new hot-spare.

Note – When you install a HDD, open its securing latch before you push the drive into the bay. Push the HDD into the bay until it stops, then close the securing latch to fully engage the connector on the HDD backplane.

4.4.11 Replacing a Hard Disk Drive Backplane

Follow these steps to remove and replace the HDD backplane.

Note – This component is a FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 4-9 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-11 Sun Fire X4200 Supported HDD Backplane Part Numbers

Component	Part Number
Hard disk drive backplane (for Sun Fire X4200)	501-6976

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**
4. **Remove the front bezel as described in Section 4.2.3, "Removing the Front Bezel" on page 4-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 4.2.4, "Removing the Front Cover" on page 4-5.**
6. **Label the HDDs with adhesive notes or another method so that you will know where to reinstall them at the end of the procedure.**

Note – When you replace the HDDs to their bays, you must return each HDD to the bay from which it was removed. Use an adhesive note or another method to temporarily label the HDDs after you remove them.

---

7. **Remove all HDDs from the drive bays:**

   a. **Press the button on the face of the HDD to release the spring-loaded securing latch. See** FIGURE 4-37**.**

   b. **Grasp the securing latch and remove the HDD from the drive bay.**

FIGURE 4-37 Opening the Hard Disk Drive Latch

8. **Unfasten the spring-loaded thumbscrew that secures the flex cable retainer and remove this retainer from the chassis. See** FIGURE 4-38**.**

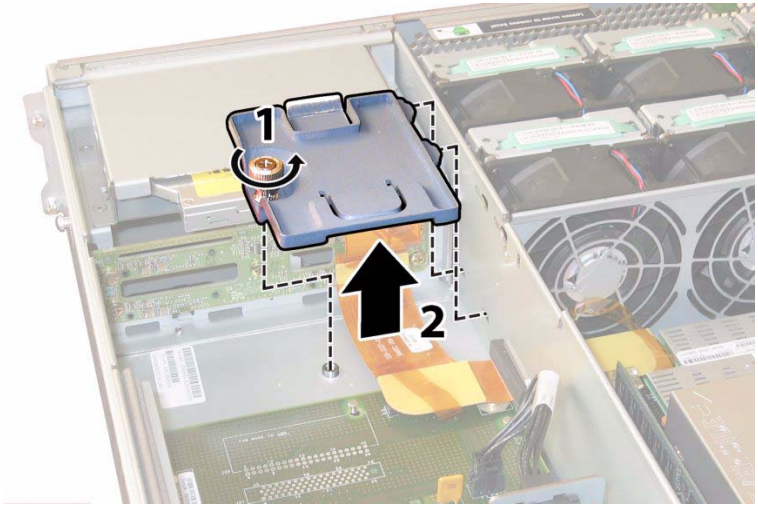


FIGURE 4-38 Removing the Flex Cable Retainer

9. **Remove the upper cable retainer from the chassis. Push the retainer toward the rear of the chassis to free it from the keyed openings in the chassis midwall. See** FIGURE 4-39**.**

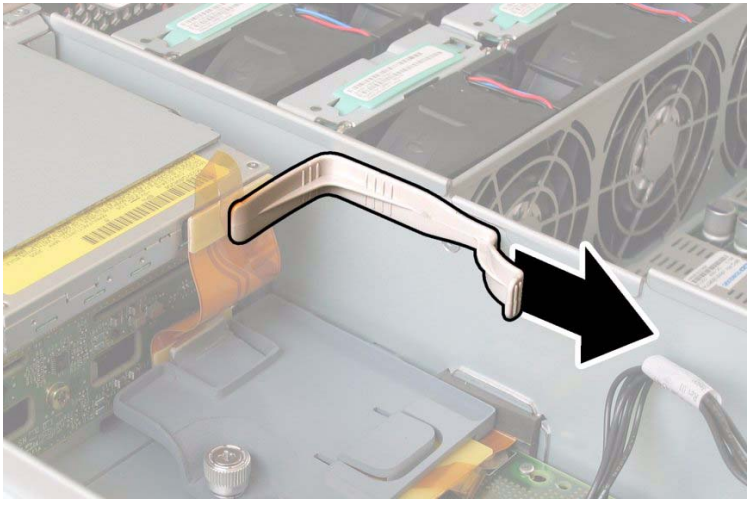


FIGURE 4-39 Removing the Upper Cable Retainer

10. **Disconnect the flex cable connectors from the rear of the DVD-ROM drive and the HDD backplane. See** FIGURE 4-40**.**

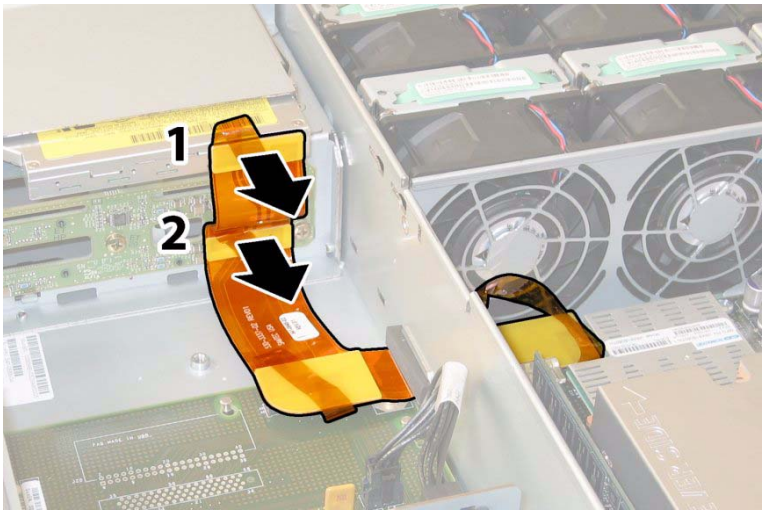


FIGURE 4-40 Disconnecting the Flex Cable From the DVD Drive and the HDD Backplane

11. **Remove the DVD-ROM drive:**

    a. **Pull the spring latch at the front of the DVD-ROM drive to the left and hold it. See** FIGURE 4-41**.**

    b. **Use your other hand to reach behind the drive and push it out through the front of the chassis.**

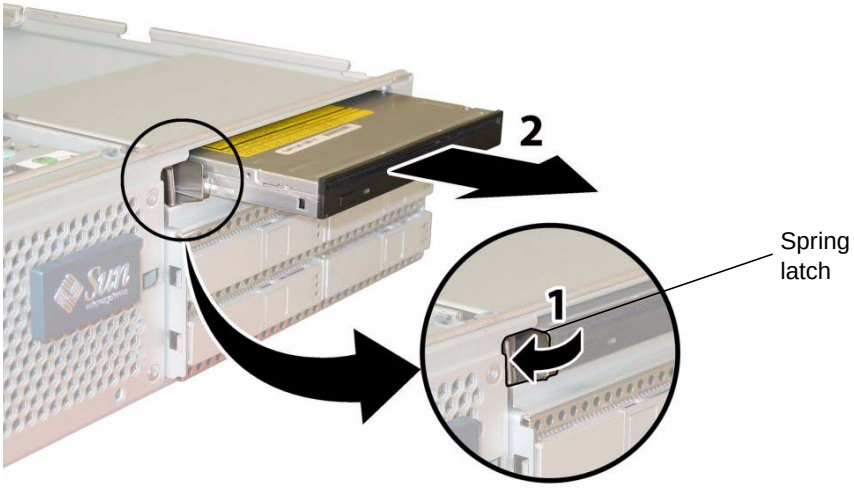


FIGURE 4-41 Removing the DVD-ROM Drive

12. **Unfasten the five screws that secure the HDD backplane to the rear of the drive bays. See** FIGURE 4-42**.**

13. **Remove the HDD backplane from the chassis.**

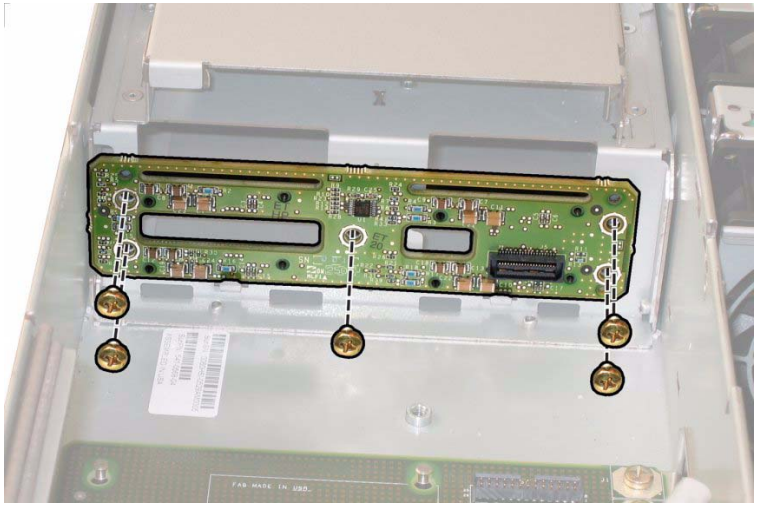


FIGURE 4-42 Removing the HDD Backplane

Installation is the reverse of this procedure.

Note – When you replace the HDDs to their bays, you must return each HDD to the bay from which it was removed. If the HDDs were previously configured as a mirrored RAID 1 array, an automatic resynchronization is invoked with no need to reconfigure the RAID parameters. Any hot-spares are automatically reconfigured as hot-spares in the configuration.

Note – When you reinstall a HDD, open its securing latch before you push the drive into the bay. Push the HDD into the bay until it stops, then close the securing latch to fully engage the connector on the HDD backplane.

4.4.12 Replacing Memory Modules (DIMMs)

Follow these steps to remove and replace the server's dual inline memory modules (DIMMs).

Note – This component is a CRU and can be replaced by anyone.

TABLE 4-12 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-12 Sun Fire X4200 Supported DIMM Part Numbers

Component	Part Number
1 GB (DIMM pair 2 x 512-MB DDR1/400)	540-6454
2 GB (DIMM pair 2 x 1-GB DDR1/400)	540-6453
4 GB (DIMM pair 2 x 2-GB DDR1/400)	540-6497

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**
4. **Locate the DIMM slot on the motherboard to which you will install or replace a DIMM.**

   The DIMM ejector levers contain LEDs that can indicate a faulty DIMM:

   - DIMM ejector LED is off: The DIMM is operating properly.
   - DIMM ejector LED is on (amber): The DIMM is faulty and should be replaced.

Note – To see the fault LEDs in the ejector levers of the DIMM slots, you must put the server in standby power mode, with the AC power cords attached. See Section 4.2.1, "Powering Off the Server" on page 4-2.

The internal system software designation of the DIMM slots is shown in FIGURE 4-43.

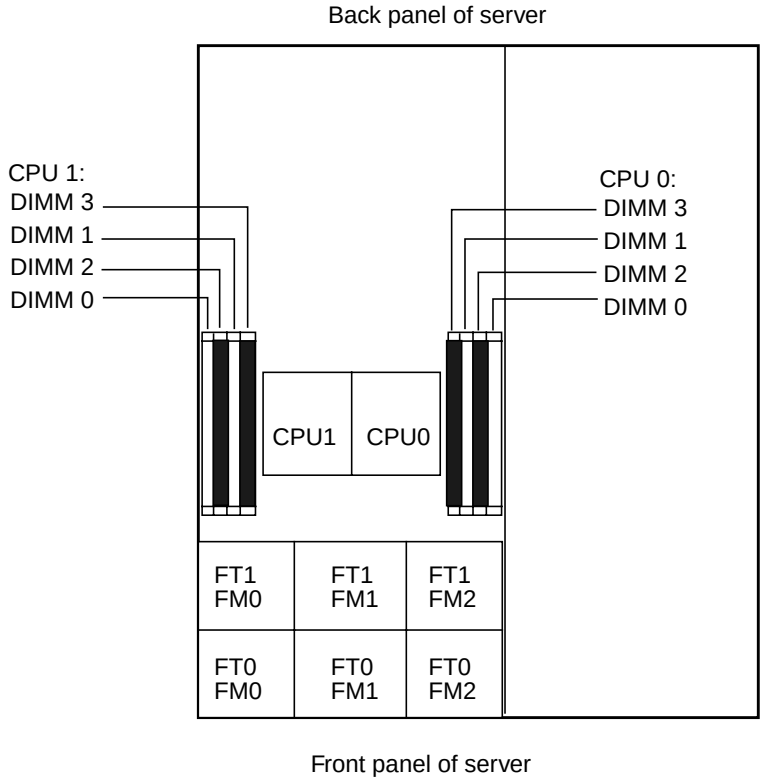


FIGURE 4-43 Sun Fire X4200 Designation of DIMM Slots

5. **Review the following list of memory configuration guidelines and the supported DIMM configurations listed in** TABLE 4-13 **before you remove or install any DIMMs:**
   - Each CPU can support a maximum of four DIMMs.
   - The DIMM slots are paired and the DIMMs must be installed in pairs (0 and 1, 2 and 3). See FIGURE 4-43 and TABLE 4-13. The memory sockets are colored black or white to indicate which slots are paired by matching colors.
   - CPUs with only a single pair of DIMMs must have those DIMMs installed in that CPU's white DIMM slots (0 and 1). See FIGURE 4-43.
   - Only PC3200 ECC and PC2700 ECC Registered DIMMs are supported.
   - Each pair of DIMMs must be identical (same manufacturer, size, and speed).

TABLE 4-13 Supported DIMM Configurations

Slot 3	Slot 1	Slot 2	Slot 0	Total Memory Per CPU
0	512 MB	0	512 MB	1 GB
512 MB	512 MB	512 MB	512 MB	2 GB
512 MB	1 GB	512 MB	1 GB	3 GB
512 MB	2 GB	512 MB	2 GB	5 GB
0	1 GB	0	1 GB	2 GB
1 GB	512 MB	1 GB	512 MB	3 GB
1 GB	1 GB	1 GB	1 GB	4 GB
1 GB	2 GB	1 GB	2 GB	6 GB
0	2 GB	0	2 GB	4 GB
2 GB	512 MB	2 GB	512 MB	5 GB
2 GB	1 GB	2 GB	1 GB	6 GB
2 GB	2 GB	2 GB	2 GB	8 GB

6. **To remove a DIMM:**

   a. **Rotate both DIMM slot ejectors outward as far as they will go. The DIMM is partially ejected from the socket. See** FIGURE 4-44**.**

   b. **Carefully lift the DIMM straight up to remove it from the socket.**

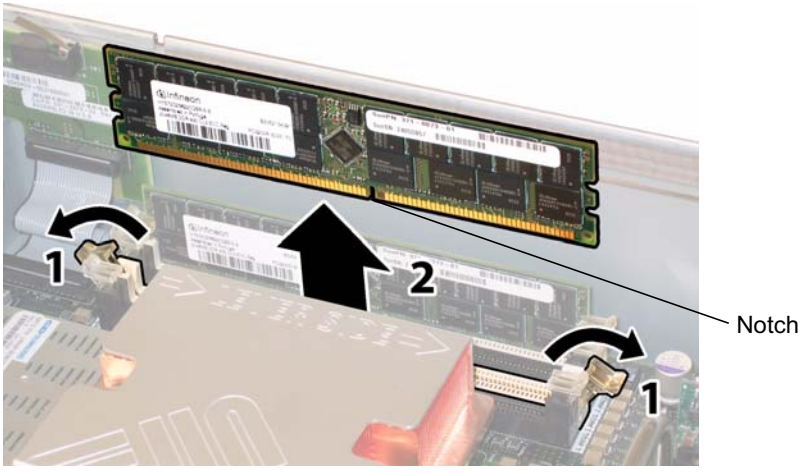


FIGURE 4-44 Removing a DIMM

7. **To install a DIMM:**

   a. **Ensure that the DIMM slot ejectors at each end of the memory socket are fully open (rotated outward) to accept the new DIMM.**

   b. **Align the notch in the bottom edge of the DIMM with the key in the DIMM socket. See** FIGURE 4-44**.**

   c. **Press down evenly on both top corners of the DIMM until the ejectors snap over the cutouts in the left and right edges of the DIMM.**

4.4.13 Replacing the Motherboard

Follow these steps to remove and replace the motherboard.

Note – This component is a FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 4-14 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-14 Sun Fire X4200 Supported Motherboard Part Numbers

Component	Part Number
Motherboard, Sun Fire X4200 (RoHS-compliant, replaces 501-6974 and 501-7645)	501-7514

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**
4. **Remove the front bezel as described in Section 4.2.3, "Removing the Front Bezel" on page 4-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 4.2.4, "Removing the Front Cover" on page 4-5.**
6. **Remove all PCI cards:**
   a. **Disconnect any external cables from the PCI cards.**
   b. **Working from the rear of the chassis, pivot each card latch to release the rear of the PCI cards. See** FIGURE 4-45**.**

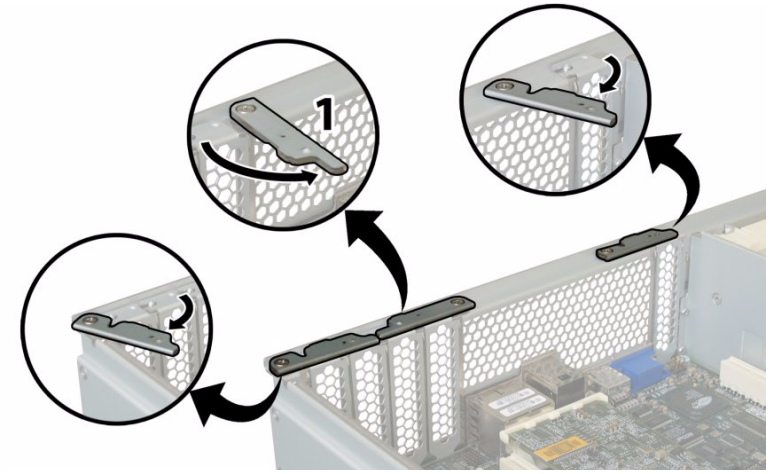


FIGURE 4-45 Opening the PCI Card Latches

c. Pull the PCI cards out of the PCI slots. Ensure that each PCI card's rear connector panel is released from the tabs on the chassis rear panel.

d. Pivot the PCI card latches back to their closed positions.

7. Remove the Graphics Redirect and Service Processor (GRASP) board:

a. Disconnect any external cables from the GRASP board's connectors.

b. Squeeze the plastic standoff that protrudes through the GRASP board to press the standoff's locking tabs. See FIGURE 4-46**.**

If you have difficulty pressing the locking tabs with your fingers, you can use a pair of long-nosed pliers.

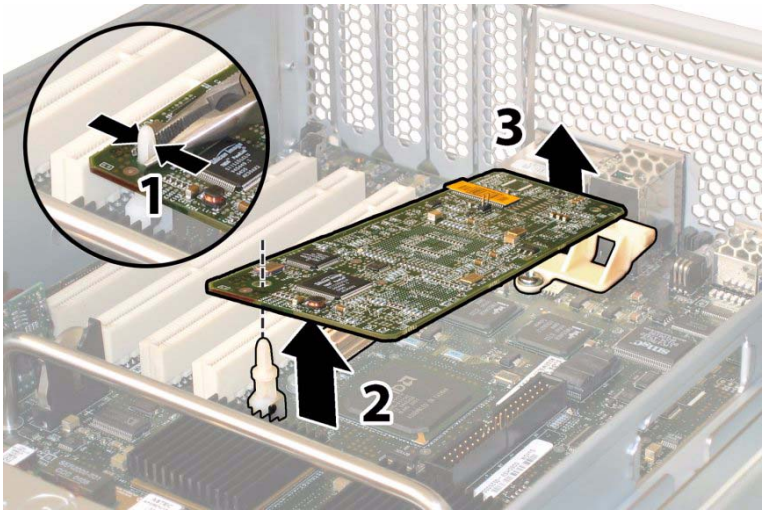


FIGURE 4-46 Removing the GRASP Board

c. Raise the corner of the GRASP board until it is clear of the locking tab.

d. Pivot the front edge of the GRASP board upward to disengage it from the rear plastic bracket and to disengage its connector from the motherboard.

8. Remove all DIMMs from the motherboard:

a. Rotate both DIMM slot ejectors outward as far as they will go. The DIMM is partially ejected from the socket. See FIGURE 4-47**.**

b. Carefully lift the DIMM straight up to remove it from the socket.

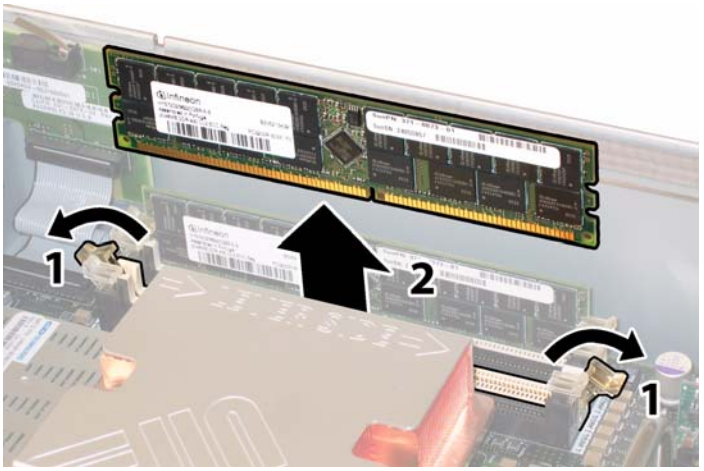


FIGURE 4-47 Removing a DIMM

9. **Remove all CPUs from the motherboard:**

   a. **Hold down on the top of the heatsink to prevent it from tipping unevenly while you alternately loosen the two spring-loaded mounting screws that secure the heatsink to the motherboard. Turn the screws 180-degrees at a time, then remove the screws when they are detached. See** FIGURE 4-48 **and** FIGURE 4-49**.**

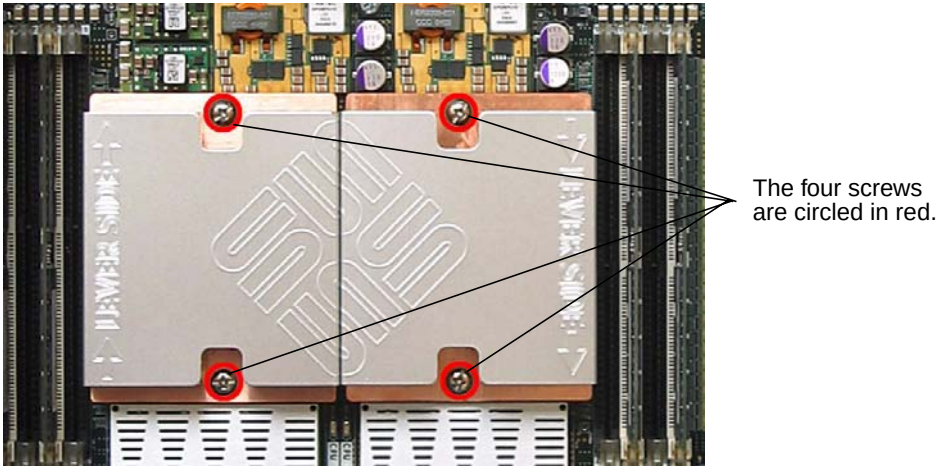


FIGURE 4-48 Location of the Heatsink Screws

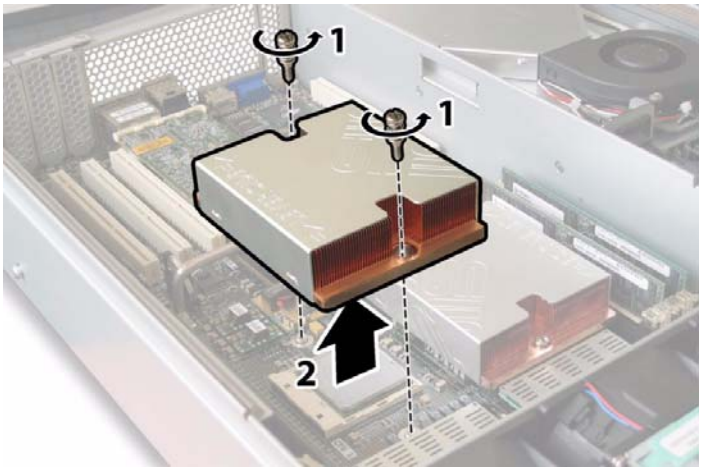


FIGURE 4-49 Removing the Heatsink

b. Twist the heatsink slightly to lift it off of the CPU. Turn the heatsink upside down and allow the spring in each of the two mounting holes to fall out into your hand.

Note – Set the heatsink upside down on a clean, flat surface to prevent the thermal grease from contaminating other components.

---

c. Pull the socket lever slightly away from the socket. See FIGURE 4-50**.**

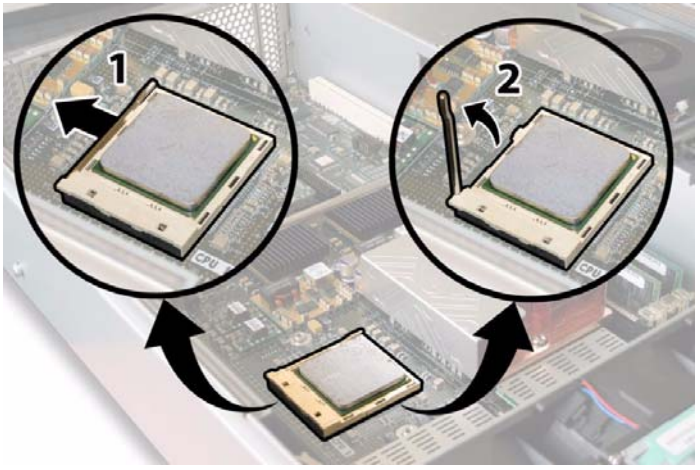


FIGURE 4-50 Releasing the CPU Socket Lever

d. Pivot the lever up, into the fully open, vertical, position.

e. Lift the CPU out of the socket, leaving the lever in the vertical, open position. See FIGURE 4-51**.**

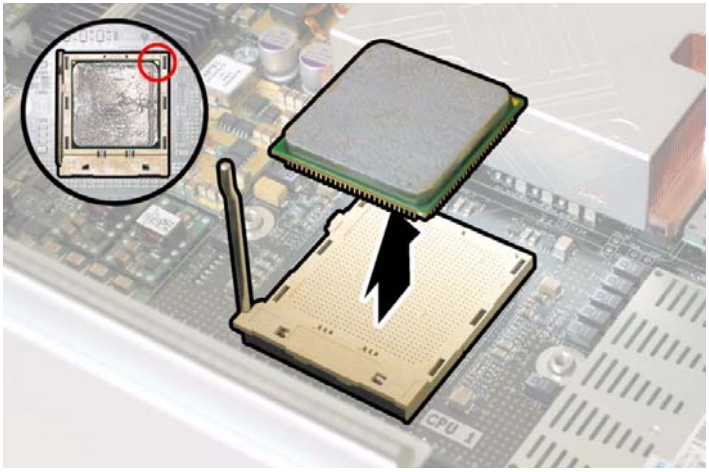


FIGURE 4-51 Removing the CPU From the Socket

10. Disconnect and remove the interconnect cable that connects the motherboard and the front I/O board. See FIGURE 4-52**.**

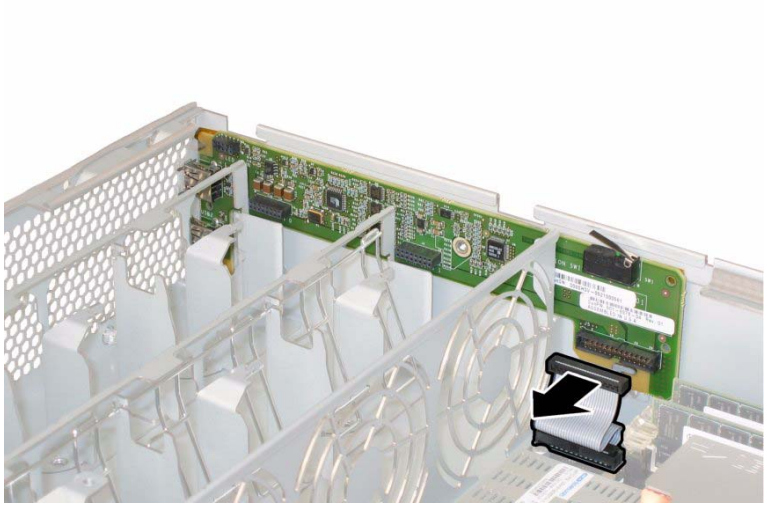


FIGURE 4-52 Disconnecting the Interconnect Cable

11. **Unfasten the spring-loaded thumbscrew that secures the flex cable retainer and remove this retainer from the chassis. See** FIGURE 4-53**.**

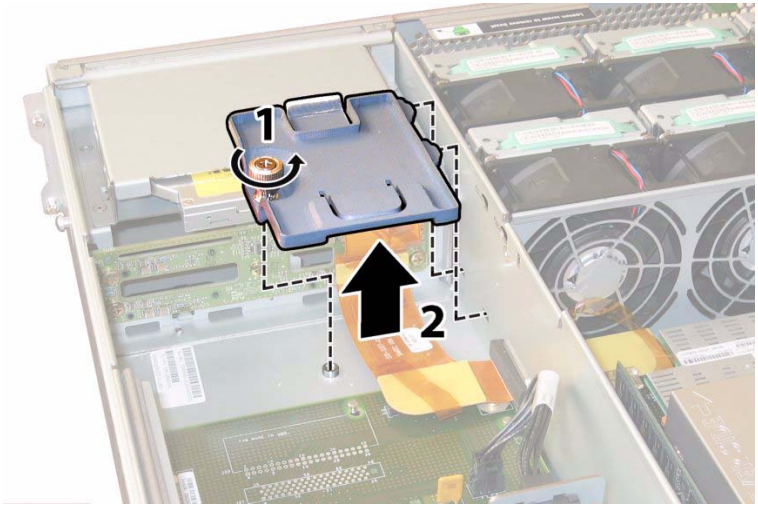


FIGURE 4-53 Removing the Flex Cable Retainer

12. **Remove the upper cable retainer from the chassis. Push the retainer toward the rear of the chassis to free it from the keyed openings in the chassis midwall. See** FIGURE 4-54**.**

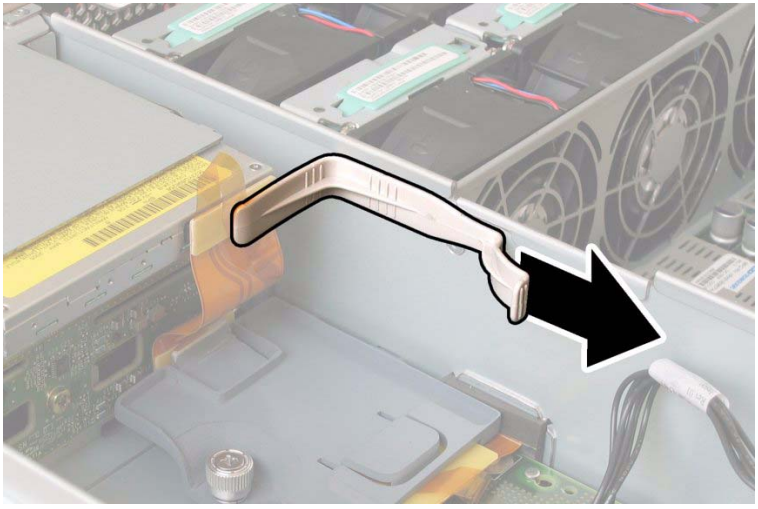


FIGURE 4-54 Removing the Upper Cable Retainer

13. **Remove the flex cable and its attached foam rubber gasket from the chassis inner wall by disconnecting the cable's four connectors from the following four locations. See** FIGURE 4-55**.**

    1. DVD-ROM drive
    2. Hard disk drive backplane
    3. Power distribution board
    4. Motherboard

Note – When reinstalling the flex cable, attach the connector to the power distribution board (3) first. Then attach the remaining three connectors in any order.

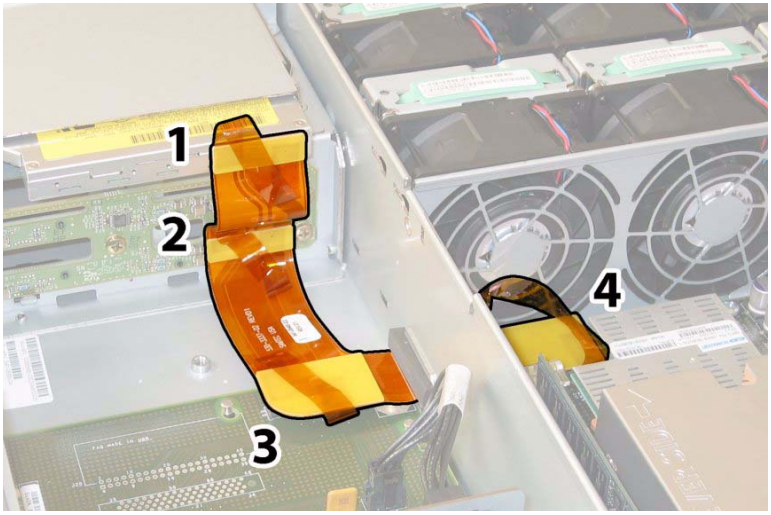


FIGURE 4-55 Disconnecting the Flex Cable's Four Connectors

14. **Unfasten and remove the eight screws that secure the motherboard to the chassis floor. See** FIGURE 4-56 **for the location of the eight screws.**

15. **Use an 8mm nut-driver to remove the two bus-bar nuts from the motherboard. See** FIGURE 4-56**.**

Note – If you remove the HDDs from the server for any reason during this procedure, you must return each HDD to the bay from which it was removed. Use an adhesive note or another method to temporarily label the HDDs after you remove them.

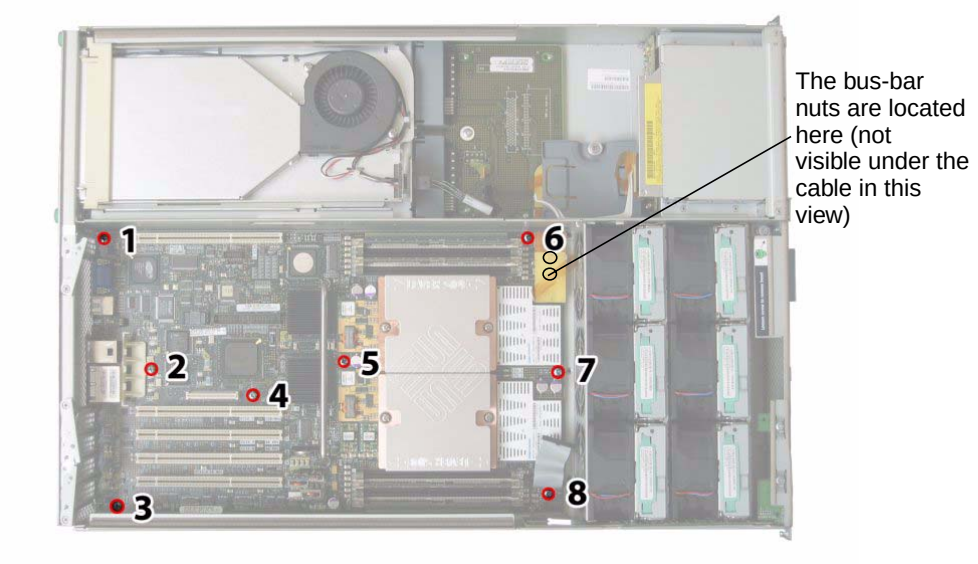


FIGURE 4-56 Motherboard Securing Screw and Bus-Bar Nut Locations

16. **Use the lifting handle to raise the forward edge of the board until it has cleared the bus bar studs.**

Caution – When lifting the board, use caution to avoid damaging the light pipes and connectors on the rear edge of the motherboard.

17. **Slide the board toward the front of the chassis until the connectors and light pipes are clear of the chassis back panel. Then raise the motherboard and remove it from the chassis.**

Caution – When reinstalling the CPUs, follow the instructions in Section 4.4.2, "Replacing a CPU and Heatsink" on page 4-10.

Installation is the reverse of this procedure.

Note – If you removed the HDDs from the server, when you replace the HDDs to their bays, you must return each HDD to the bay from which it was removed. If the HDDs were previously configured as a mirrored RAID 1 array, an automatic resynchronization is invoked with no need to reconfigure the RAID parameters. Any hot-spares are automatically reconfigured as hot-spares in the configuration.

4.4.14 Replacing PCI Cards

Follow these steps to remove and replace a PCI card.

Note – This component is a CRU and can be replaced by anyone.

TABLE 4-15 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-15 Sun Fire X4200 Supported PCI Card Part Numbers

Component	Part Number
PCIX Cards	
LSI single-port U320 SCSI HBA	375-3255
2-GB single-port x86 HBA	375-3253
2-GB dual-port Fibre Channel HBA	375-3108
4-GB single-port Fibre Channel HBA	375-3354
4-GB dual-port Fibre Channel HBA	375-3294
Sun 2-port 4x IB HCA, LP	375-3260
Dual Gigabit-Ethernet (copper)	371-0911
Dual Gigabit-Ethernet (Fibre Channel)	371-0912
Sun 10-GB Ethernet LP	375-3301
LSI single-port U320 SCSI HBA	375-3255

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**
4. **Locate the PCI card slot in which you will install or replace a PCI car.**

   The system designation and the speeds of the five PCI slots are shown in FIGURE 4-57.

The slots for the PCI cards are detected by the system BIOS during bootup in the order described in Section 2.3.2.1, “PCI Card Slot Booting Priority” on page 2-5.

Note – Before you install a card, consult the manufacturer's documentation for system requirements and configuration information for your specific PCI card.

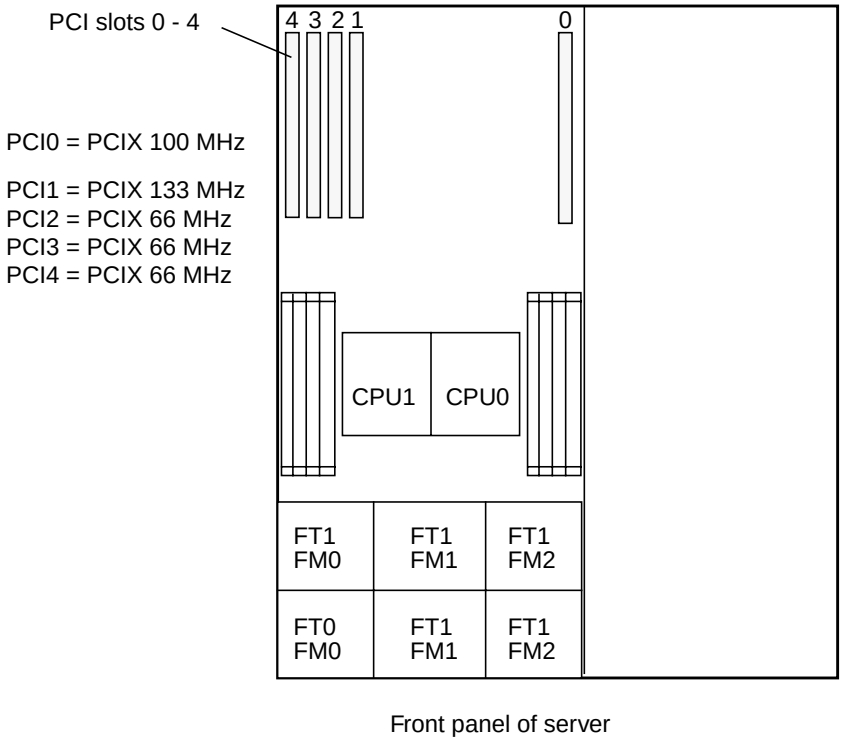


FIGURE 4-57 Sun Fire X4200 Designation and Speeds of PCI Slots

5. **Remove any existing PCI card from the slot, or go to Step 7 if the slot is empty:**

   a. **Disconnect any external cables that are attached to the PCI card.**

   b. **Working from the rear of the chassis, pivot open the PCI card latch that covers the PCI card’s rear connector panel. See** FIGURE 4-58**.**

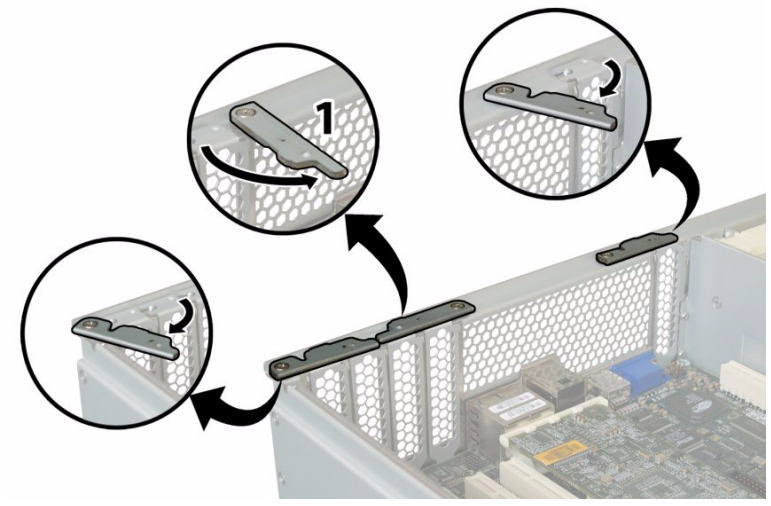


FIGURE 4-58 Opening a PCI Card Securing Latch

c. Pull the PCI card out of the PCI slot. Ensure that the PCI card's rear connector panel is released from the tab on the chassis rear panel.

6. If there is no PCI card in the slot, remove the PCI-card filler panel from the chassis back panel. See FIGURE 4-59**.**

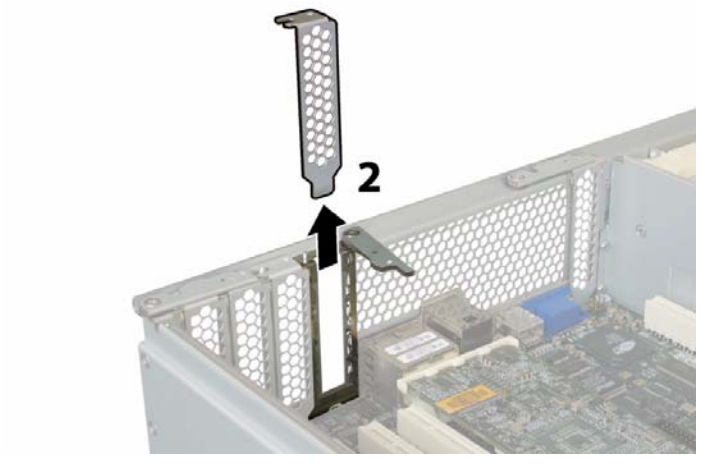


FIGURE 4-59 Removing a PCI-Card Filler Panel

7. **Install a PCI card:**

   a. **Working from the rear of the chassis, pivot the PCI card latch for the slot open to receive the new PCI card. See** FIGURE 4-58**.**

   b. **Insert the PCI card into the PCI card slot. Ensure that the PCI card's rear connector panel engages the tab in the chassis rear panel. See** FIGURE 4-60**.**

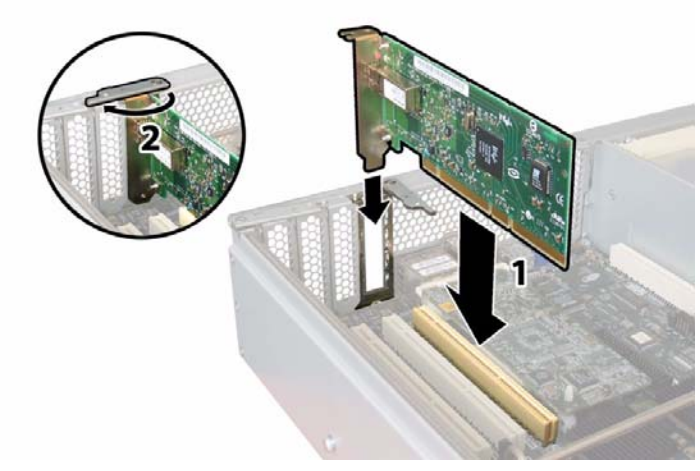


FIGURE 4-60 Installing a PCI Card

   c. **Pivot the PCI card latch closed over the rear connector panel of the PCI card until it locks. See** FIGURE 4-60**.**

4.4.15 Replacing a Power Supply

Follow these steps to remove and replace a power supply.

Note – This component is a hot-swappable CRU and can be replaced by anyone.

TABLE 4-16 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-16 Sun Fire X4200 Supported Power Supply Part Numbers

Component	Part Number
Power supply (550W) (RoHS-compliant, replaces 300-1757)	300-1945

The internal system software designation of the two power supplies in the server is shown in FIGURE 4-61.

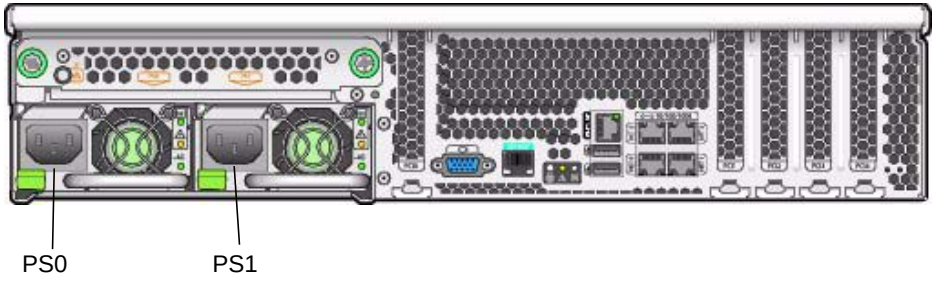


FIGURE 4-61 Sun Fire X4200 Designation of Power Supplies

1. **Identify which power supply you will replace. Each power supply has three LEDs that you can view from the rear of the server:**
   - Top LED is on (green): Power supply is operating properly.
   - Middle LED is on (amber): Power supply is faulty and should be replaced.
   - Bottom LED is on (green): AC power source to power supply is operating properly.
2. **Disconnect the AC power cord from the power supply that you are replacing.**

   The power supplies are hot-swappable, so you do not have to shut down the server or disconnect the second power supply.

Note – The Service Action Required LEDs on the front panel and back panel blink when a power supply is unplugged. See Section C.1, "External Status Indicator LEDs" on page C-1 for the LED locations and descriptions.

3. **Remove the power supply:**

   a. **Grasp the power supply handle and push the thumb latch toward the center of the power supply. See** FIGURE 4-62**.**

   b. **While continuing to push on the latch, use the handle to remove the power supply from the chassis.**

FIGURE 4-62 Removing a Power Supply

Installation is the reverse of this procedure.

Note – When installing a new power supply, press it into the bay until the thumb latch clicks, indicating that it is locked.

4.4.16 Replacing the Power Distribution Board

Follow these steps to remove and replace the power distribution board (PDB).

Note – This component is a FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 4-17 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-17 Sun Fire X4200 Supported Power Distribution Board Part Numbers

Component	Part Number
Power distribution board	501-6920

1. **Power off the server as described in Section 4.2.1, "Powering Off the Server" on page 4-2.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in Section 4.2.2, "Removing the Main Cover" on page 4-3.**
4. **Remove the front bezel as described in Section 4.2.3, "Removing the Front Bezel" on page 4-4.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in Section 4.2.4, "Removing the Front Cover" on page 4-5.**
6. **Remove both power supplies:**
   a. **Grasp the power supply handle and push the thumb latch toward the center of the power supply. See** FIGURE 4-63**.**
   b. **While continuing to push on the latch, use the handle to remove the power supply from the chassis.**

FIGURE 4-63 Removing a Power Supply

7. **Unfasten the spring-loaded thumbscrew that secures the flex cable retainer and remove this retainer from the chassis. See** FIGURE 4-64**.**

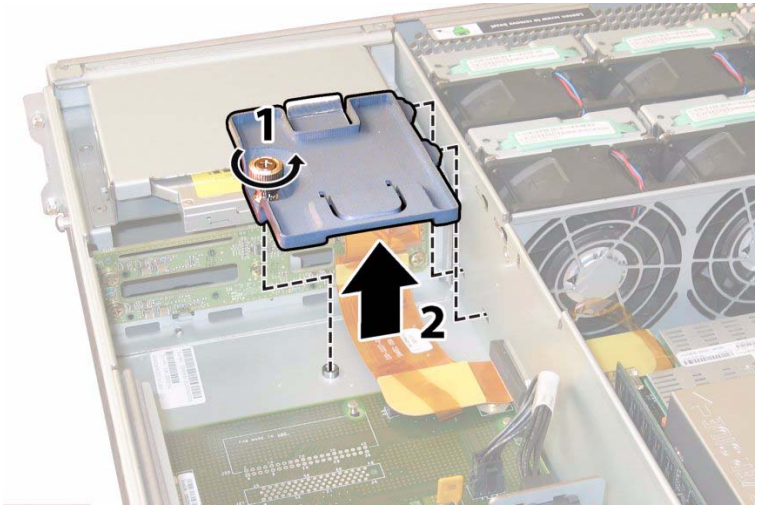


FIGURE 4-64 Removing the Flex Cable Retainer

8. **Remove the upper cable retainer from the chassis. Push the retainer toward the rear of the chassis to free it from the keyed openings in the chassis midwall. See** FIGURE 4-65**.**

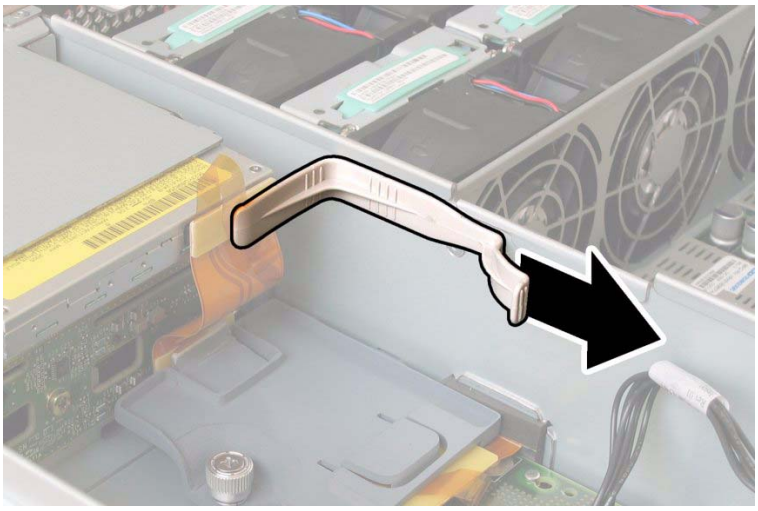


FIGURE 4-65 Removing the Upper Cable Retainer

9. **Remove the flex cable and its attached foam rubber gasket from the chassis midwall by disconnecting the cable's four connectors from the following four locations. See** FIGURE 4-66**.**

   1. DVD-ROM drive
   2. Hard disk drive backplane
   3. Power distribution board
   4. Motherboard

Note – When reinstalling the flex cable, attach the connector to the power distribution board (3) first. Then attach the remaining three connectors in any order.

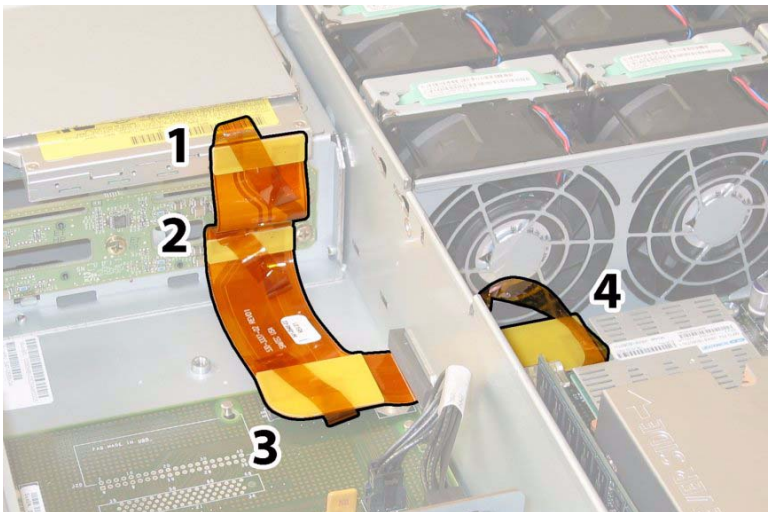


FIGURE 4-66 Disconnecting the Flex Cable's Four Connectors

10. **Disconnect the rear fan tray cable from the connector on the power distribution board. See** FIGURE 4-67**.**

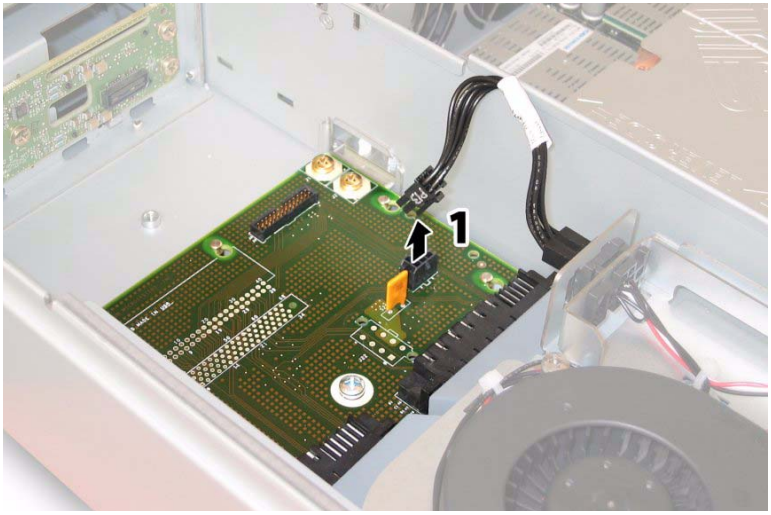


FIGURE 4-67 Disconnecting the Rear Fan Tray From the Power Distribution Board

11. **Use a No. 2 Phillips screwdriver to remove the three screws that secure the power distribution board to the chassis and bus bars. See** FIGURE 4-68**.**

12. **Raise the plastic air baffles that cover the power supply connectors up and toward the rear of the chassis to provide clearance.**

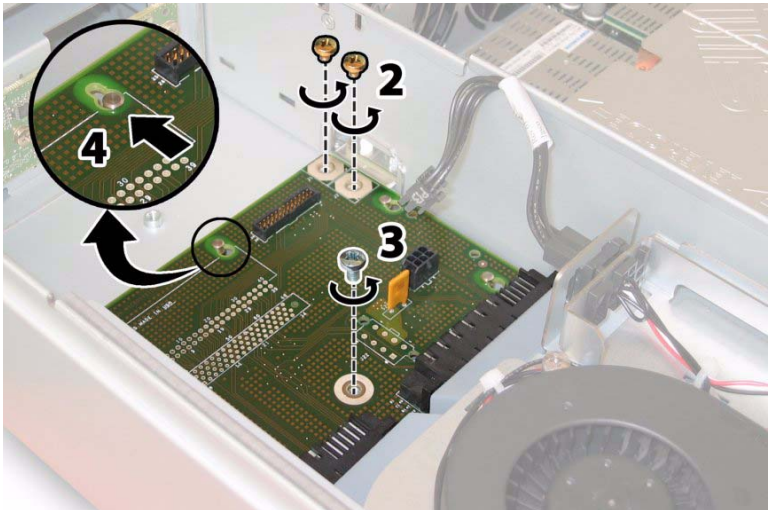


FIGURE 4-68 Disconnecting the Power Distribution Board From the Chassis

13. **Slide the power distribution board toward the front of the chassis to release the five chassis standoffs from the keyways in the board.**

14. **Lift the board up off of the chassis standoffs and remove it from the chassis.**

FIGURE 4-69 Removing the Power Distribution Board

Installation is the reverse of this procedure.

Note – When you reinstall the power distribution board, ensure that the plastic air baffles on the chassis are fully raised to provide clearance for the rear of the board.

4.4.17 Replacing the Rear Fan Tray

Follow these steps to remove and replace the rear fan tray.

Note – This component is a hot-swappable CRU and can be replaced by anyone.

TABLE 4-18 lists the qualified part numbers for this component. These part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

TABLE 4-18 Sun Fire X4200 Supported Rear Fan Tray (Blower Tray) Part Numbers

Component	Part Number
Blower tray assembly (Sun Fire X4200 rear fan tray)	541-0645

1. **Working from the rear of the server, unfasten the two captive thumbscrews on the face of the rear fan tray. See** FIGURE 4-70

   The internal system software designation of the rear fan tray is FT3. The rear fan tray has one fault LED on its face:

   - LED is off: Fan tray is operating properly.
   - LED is on (amber): Fan tray is faulty and should be replaced.

2. **Remove the rear fan tray from the chassis.**

   The fan tray's cable connector disengages from the internal connector on the chassis.

Note – In FIGURE 4-70, the server is shown with the cover off for visibility of the component; do not remove the cover for this procedure.

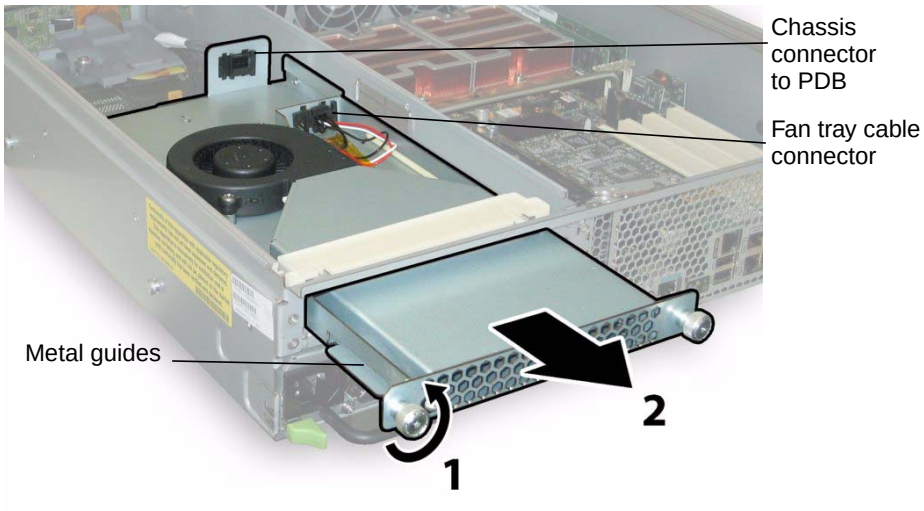


FIGURE 4-70 Removing the Rear Fan Tray

Installation is the reverse of this procedure.

Note – When you reinstall the new rear fan tray, ensure that the metal guides on the fan tray sides (see FIGURE 4-70) engage the plastic rails inside the chassis bay evenly.

APPENDIX **A**

System Specs

This appendix contains physical, power, environmental, and acoustic noise emission specifications for the Sun Fire X4100 server and the Sun Fire X4200 server.

A.1 Sun Fire X4100 Specifications

TABLE A-1 Sun Fire X4100 Physical Specifications

Specification	Value
Width	17 inches (432 mm)
Height	1.7 inches (44 mm)
Depth	24 inches (610 mm)
Weight	17 pounds (8 kg)

TABLE A-2 Sun Fire X4100 Power Specifications

Specification	Value
Universal AC Input	100-240 VAC, 50/60 Hz
Maximum input current at 200 VAC	3.5 A
Maximum input current at 100 VAC	7.0 A
Maximum power	550 W
Maximum output supply current of each USB port	500 mA

TABLE A-3 Sun Fire X4100 Environmental Specifications

Specification	Value
Temperature (operating)	41 - 95° F 5 - 35° C
Temperature (storage)	-40 - 158° F -40 - 70° C
Humidity	10% - 90% non-condensing
Operating altitude	0 - 10,000 feet (0 - 3048 m)

TABLE A-4 contains the declared noise emissions in accordance with ISO 9296, A-weighted, operating, and idling.

TABLE A-4 Sun Fire X4100 Acoustic Noise Emission Specifications

Specification	Value
L_{wAd} at or below 77° F (25° C) (1 B = 10 dB)	7.8 B
L_{wAd} at max ambient (1 B = 10 dB)	8.3 B
L_{pAm} bystander at or below 77° F (25° C)	63 dB
L_{pAm} at max ambient	67 dB

A.2 Sun Fire X4200 Specifications

TABLE A-5 Sun Fire X4200 Physical Specifications

Specification	Value
Width	17 inches (432 mm)
Height	3.45 inches (88 mm)
Depth	24 inches (610 mm)
Weight	35 pounds (16 kg)

TABLE A-6 Sun Fire X4200 Power Specifications

Specification	Value
Universal AC Input	100-240 VAC, 50/60 Hz
Maximum input current at 200 VAC	3.5 A
Maximum input current at 100 VAC	7.0 A
Maximum power	550 W
Maximum output supply current of each USB port	500 mA

TABLE A-7 Sun Fire X4200 Environmental Specifications

Specification	Value
Temperature (operating)	41 - 95˚ F 5 - 35˚ C
Temperature (storage)	-40 - 158˚ F -40 - 70˚ C
Humidity	10% - 90% non-condensing
Operating altitude	0 - 10,000 feet (0 - 3048 m)

TABLE A-8 contains the declared noise emissions in accordance with ISO 9296, A-weighted, operating, and idling.

TABLE A-8 Sun Fire X4200 Acoustic Noise Emission Specifications

Specification	Value
L_{wAd} at or below 77° F (25° C) (1 B = 10 dB)	8.0 B
L_{wAd} at max ambient (1 B = 10 dB)	8.4 B
L_{pAm} bystander at or below 77° F (25° C)	66 dB
L_{pAm} at max ambient	69 dB

APPENDIX **B**

BIOS POST Codes

B.1 Power-On Self-Test (POST)

The system BIOS provides a rudimentary power-on self-test. The basic devices required for the server to operate are checked, memory is tested, the LSI 1064 disk controller and attached disks are probed and enumerated, and the two Intel dual-gigabit Ethernet controllers are initialized.

The progress of the self-test is indicated by a series of POST codes.

These codes are displayed at the bottom right corner of the system's VGA screen (once the self-test has progressed far enough to initialize the video monitor). However, the codes are displayed as the self-test runs and scroll off of the screen too quickly to be read. An alternate method of displaying the POST codes is to redirect the output of the console to a serial port (see Section B.1.2, "Redirecting Console Output" on page B-2).

The message, `BMC Responding` is displayed at the end of POST.

B.1.1 How BIOS POST Memory Testing Works

The BIOS POST memory testing is performed as follows:

1. The first megabyte of DRAM is tested by the BIOS before the BIOS code is shadowed (that is, copied from ROM to DRAM).
2. Once executing out of DRAM, the BIOS performs a simple memory test (a write/read of every location with the pattern `55aa55aa`).

Note – This memory test is performed only if Quick Boot is *not* enabled from the Boot Settings Configuration screen. Enabling Quick Boot causes the BIOS to skip the memory test. See Section B.1.3, "Changing POST Options" on page B-3 for more information.

---

3. The BIOS polls the memory controllers for both correctable and uncorrectable memory errors and logs those errors into the service processor.

B.1.2 Redirecting Console Output

Use these instructions to access the service processor and redirect the console output so that the BIOS POST codes can be read.

1. **Initialize the BIOS Setup utility by pressing the F2 key while the system is performing the power-on self-test (POST).**
2. **When the BIOS Main Menu screen is displayed, select Advanced.**
3. **When the Advanced Settings screen is displayed, select IPMI 2.0 Configuration.**
4. **When the IPMI 2.0 Configuration screen is displayed, select the LAN Configuration menu item.**
5. **Select the IP Address menu item.**

   The service processor's IP address is displayed using the following format:
   `Current IP address in BMC: xxx.xxx.xxx.xxx`
6. **Start a web browser and type the service processor's IP address in the browser's URL field.**
7. **When you are prompted, type a user name and password as follows:**

   User name: **`root`**
   Password: **`changeme`**
8. **When the ILOM Service Processor GUI screen is displayed, click the Remote Control tab.**

9. **Click on the Redirection tab.**
10. **Set the color depth for the redirection console at either 6 or 8 bits.**
11. **Click on the Start Redirection button.**

    The javaRConsole window appears and prompts you for your user name and password again.
12. **When you are prompted, type a user name and password as follows:**

    User name: **`root`**
    Password: **`changeme`**

    The current POST screen is displayed.

B.1.3 Changing POST Options

These instructions are optional, but you can use them to change the operations that the server performs during POST testing.

1. **Initialize the BIOS Setup utility by pressing the F2 key while the system is performing the power-on self-test (POST).**
2. **When the BIOS Main Menu screen is displayed, select the Boot menu.**
3. **From the Boot Settings screen, select Boot Settings Configuration.**
4. **On the Boot Settings Configuration screen, there are several options that you can enable or disable:**
   - **Quick Boot:** This option is disabled by default. If you enable this, the BIOS skips certain tests while booting, such as the extensive memory test. This decreases the time it takes for the system to boot.
   - **System Configuration Display:** This option is disabled by default. If you enable this, the system configuration screen is displayed before booting begins.
   - **Quiet Boot:** This option is disabled by default. If you enable this, the Sun Microsystems logo is displayed instead of POST codes.
   - **Language:** This option is reserved for future use. Do not change.
   - **Add On ROM Display Mode:** This option is set to Force BIOS by default. This option has effect only if you have also enabled the Quiet Boot option, but it controls whether output from the Option ROM is displayed. The two settings for this option are as follows:
     - **Force BIOS:** Remove the Sun logo and display Option ROM output.
     - **Keep Current:** Do not remove the Sun logo. The Option ROM output is not displayed.

- **Boot Num-Lock:** This option is On by default (keyboard Num-Lock is turned on during boot). If you set this to off, the keyboard Num-Lock is not turned on during boot.
- **Wait for F1 if Error:** This option is disabled by default. If you enable this, the system will pause if an error is found during POST and will only resume when you press the F1 key.
- **Interrupt 19 Capture:** This option is reserved for future use. Do not change.
- **Default Boot Order:** The letters in the brackets represent the boot devices. To see the letters defined, position your cursor over the field and read the definition in the right side of the screen.

B.1.4 POST Codes

TABLE B-1 contains descriptions of each of the POST codes, listed in the same order in which they are generated. These POST codes appear as a four-digit string that is a combination of two-digit output from primary I/O port 80 and two-digit output from secondary I/O port 81. In the POST codes listed in TABLE B-1, the first two digits are from port 81 and the last two digits are from port 80.

TABLE B-1 POST Codes

Post Code	Description
00d0	Coming out of POR, PCI configuration space initialization, Enabling 8111's SMBus.
00d1	Keyboard controller BAT, Waking up from PM, Saving power-on CPUID in scratch CMOS.
00d2	Disable cache, full memory sizing, and verify that flat mode is enabled.
00d3	Memory detections and sizing in boot block, cache disabled, IO APIC enabled.
01d4	Test base 512KB memory. Adjust policies and cache first 8MB.
01d5	Boot block code is copied from ROM to lower RAM. BIOS is now executing out of RAM.
01d6	Key sequence and OEM specific method is checked to determine if BIOS recovery is forced. If next code is E0, BIOS recovery is being executed. Main BIOS checksum is tested.
01d7	Restoring CPUID; moving boot block-runtime interface module to RAM; determine whether to execute serial flash.
01d8	Decompressing runtime module into RAM. Storing CPUID information in memory.
01d9	Copying main BIOS into memory.
01da	Giving control to BIOS POST.
0004	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. If the CMOS checksum is bad, update CMOS with power-on default values.
00c2	Set up boot strap processor for POST. This includes frequency calculation, loading BSP microcode, and applying user requested value for GART Error Reporting setup question.
00c3	Errata workarounds applied to the BSP (#78 & #110).
00c6	Re-enable cache for boot strap processor, and apply workarounds in the BSP for errata #106, #107, #69, and #63 if appropriate.
00c7	HT sets link frequencies and widths to their final values.
000a	Initializing the 8042 compatible Keyboard Controller.
000c	Detecting the presence of Keyboard in KBC port.
000e	Testing and initialization of different Input Devices. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1.

TABLE B-1 POST Codes *(Continued)*

Post Code	Description
8600	Preparing CPU for booting to OS by copying all of the context of the BSP to all application processors present. NOTE: APs are left in the CLI HLT state.
de00	Preparing CPU for booting to OS by copying all of the context of the BSP to all application processors present. NOTE: APs are left in the CLI HLT state.
8613	Initialize PM regs and PM PCI regs at Early-POST. Initialize multi host bridge, if system supports it. Setup ECC options before memory clearing. Enable PCI-X clock lines in the 8131.
0024	Decompress and initialize any platform specific BIOS modules.
862a	BBS ROM initialization.
002a	Generic Device Initialization Manager (DIM) - Disable all devices.
042a	ISA PnP devices - Disable all devices.
052a	PCI devices - Disable all devices.
122a	ISA devices - Static device initialization.
152a	PCI devices - Static device initialization.
252a	PCI devices - Output device initialization.
202c	Initializing different devices. Detecting and initializing the video adapter installed in the system that have optional ROMs.
002e	Initializing all the output devices.
0033	Initializing the silent boot module. Set the window for displaying text information.
0037	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
4538	PCI devices - IPL device initialization.
5538	PCI devices - General device initialization.
8600	Preparing CPU for booting to OS by copying all of the context of the BSP to all application processors present. NOTE: APs are left in the CLI HLT state.

B.1.5 POST Code Checkpoints

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. TABLE B-2 describes the type of checkpoints that might occur during the POST portion of the BIOS. These two-digit checkpoints are the output from primary I/O port 80.

TABLE B-2 POST Code Checkpoints

Post Code	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. At this point, only ROM accesses are to the GPNV. If BB size is 64K, require to turn on ROM Decode below FFFF0000h. It should allow USB to run in E000 segment. The HT must program the NB specific initialization and OEM specific initialization can program if it need at beginning of BIOS POST, like overriding the default values of Kernel Variables.
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system.
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to POSTINT1ChHandlerBlock.
C0	Early CPU Init Start--Disable Cache--Init Local APIC.
C1	Set up boot strap processor information.
C2	Set up boot strap processor for POST. This includes frequency calculation, loading BSP microcode, and applying user requested value for GART Error Reporting setup question.
C3	Errata workarounds applied to the BSP (#78 & #110).
C5	Enumerate and set up application processors. This includes microcode loading, and workarounds for errata (#78, #110, #106, #107, #69, #63).
C6	Re-enable cache for boot strap processor, and apply workarounds in the BSP for errata #106, #107, #69, and #63 if appropriate. In case of mixed CPU steppings, errors are sought and logged, and an appropriate frequency for all CPUs is found and applied. NOTE: APs are left in the CLI HLT state.
C7	The HT sets link frequencies and widths to their final values. This routine gets called after CPU frequency has been calculated to prevent bad programming.
0A	Initializes the 8042 compatible Keyboard Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.

TABLE B-2 POST Code Checkpoints *(Continued)*

Post Code	Description
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Decompress all available language, BIOS logo, and Silent logo modules.
13	Initialize PM regs and PM PCI regs at Early-POST. Initialize multi host bridge, if system support it. Setup ECC options before memory clearing. REDIRECTION causes corrected data to written to RAM immediately. CHIPKILL provides 4 bit error det/corr of x4 type memory. Enable PCI-X clock lines in the 8131.
20	Relocate all the CPUs to a unique SMBASE address. The BSP will be set to have its entry point at A000:0. If less than 5 CPU sockets are present on a board, subsequent CPUs entry points will be separated by 8000h bytes. If more than 4 CPU sockets are present, entry points are separated by 200h bytes. CPU module will be responsible for the relocation of the CPU to correct address. NOTE: APs are left in the INIT state.
24	Decompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and decompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM.
39	Initializes DMAC-1 and DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	By this point, RAM read/write test is completed, program memory holes or handle any adjustments needed in RAM size with respect to NB. Test if HT Module found an error in Boot Block and CPU compatibility for MP environment.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, etc.) successfully installed in the system and update the BDA, EBDA, etc.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.

TABLE B-2 POST Code Checkpoints *(Continued)*

Post Code	Description
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed/requested.
8C	After all device initialization is done, programmed any user selectable parameters relating to NB/SB, such as timing parameters, non-cacheable regions and the shadow RAM cacheability, and do any other NB/SB/PCIX/OEM specific programming needed during Late-POST. Background scrubbing for DRAM, and L1 and L2 caches are set up based on setup questions. Get the DRAM scrub limits from each node. Workaround for erratum #101 applied here.
8D	Build ACPI tables (if ACPI is supported).
8E	Program the peripheral parameters. Enable/Disable NMI as selected.
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module.
A7	Displays the system configuration screen if enabled. Initialize the CPUs before boot, which includes the programming of the MTRRs.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for Int 19 boot.
AC	Any kind of Chipsets (NB/SB) specific programming needed during End- POST, just before giving control to runtime code booting to OS. Programmed the system BIOS (0F0000h shadow RAM) cacheability. Ported to handle any OEM specific programming needed during End-POST. Copy OEM specific data from POST_DSEG to RUN_CSEG.

TABLE B-2 POST Code Checkpoints *(Continued)*

Post Code	Description
B1	Save system context for ACPI.
00	Prepares CPU for booting to OS by copying all of the context of the BSP to all application processors present. NOTE: APs are left in the CLIHLT state.
61-70	OEM POST Error. This range is reserved for chipset vendors and system manufacturers. The error associated with this value may be different from one platform to the next.

APPENDIX **C**

Status Indicator LEDs

C.1 External Status Indicator LEDs

FIGURE C-1 and FIGURE C-2 show the locations of the external status indicator LEDs. A Sun Fire X4200 server is pictured, but the LED locations are the same for the Sun Fire X4100 server. Refer to TABLE C-1 and TABLE C-2 for descriptions of the LED behavior, which differs slightly for Sun Fire X4200 and Sun Fire X4100 servers.

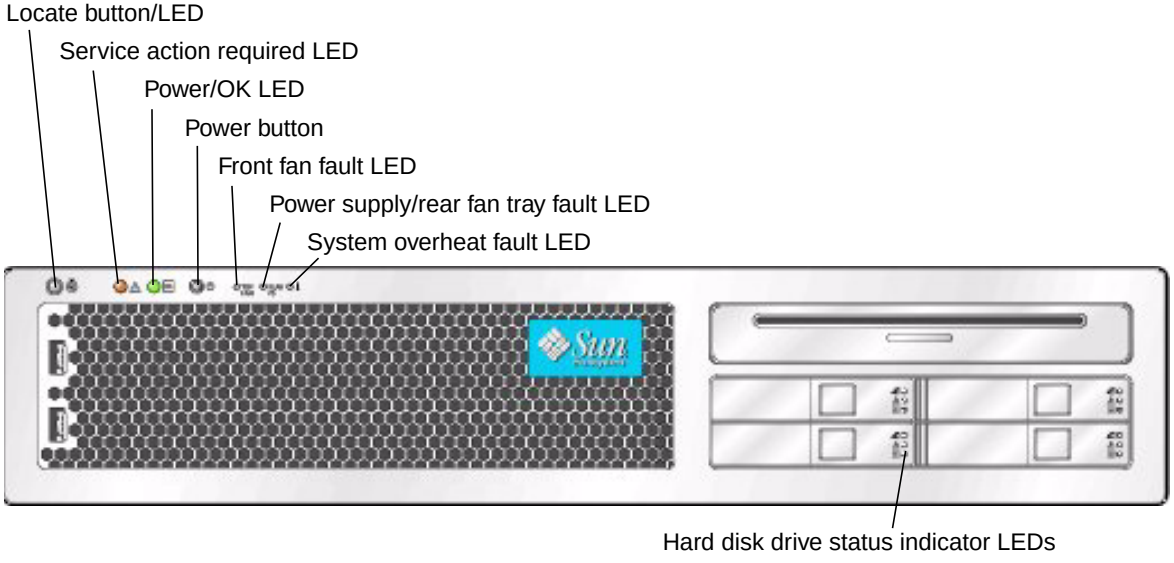


FIGURE C-1 Sun Fire X4200 Server Front Panel LEDs

TABLE C-1 Front Panel LED Functions

LED Name	Description
Locate button/LED	This LED helps you to identify which system in the rack you are working on in a rack full of servers. • Push and release this button to make the Locate LED blink for 30 minutes. • Hold down the button for 5 seconds to initiate a "push-to-test" mode that illuminates all other LEDs both inside and outside of the chassis for 15 seconds.
Service Action Required LED	This LED has two states: • Off: Normal operation. • Slow Blinking: An event that requires a service action has been detected. It also blinks when only one power supply is plugged in.
Power/OK LED	This LED has three states: • Off: Server main power and standby power are off. • Blinking: Server is in standby power mode, with AC power applied to only the GRASP board and the power supply fans. • On: Server is in main power mode with AC power supplied to all components.
Front Fan Fault LED	This LED lights when there is a failed front cooling fan module. LEDs on the individual fan modules indicate which fan module has failed.
Power Supply/rear fan tray Fault LED	This LED lights when: • Two power supplies are present in the system but only one has AC power connected. To clear this condition either plug in the second power supply or remove it from the chassis. • Any voltage related event occurs in the system. For CPU-related voltage errors the associated CPU Fault LED will also be illuminated. • (For Sun Fire X4200 only) when the rear fan tray has failed or is removed.
System Overheat Fault LED	This LED lights when an upper temperature limit is detected.
Hard Disk Drive Status LEDs	The hard disk drives have three LEDs: • Top LED (blue): reserved for future use. • Middle LED (amber): Hard disk drive failed. • Bottom LED (green): Hard disk drive is operating properly.

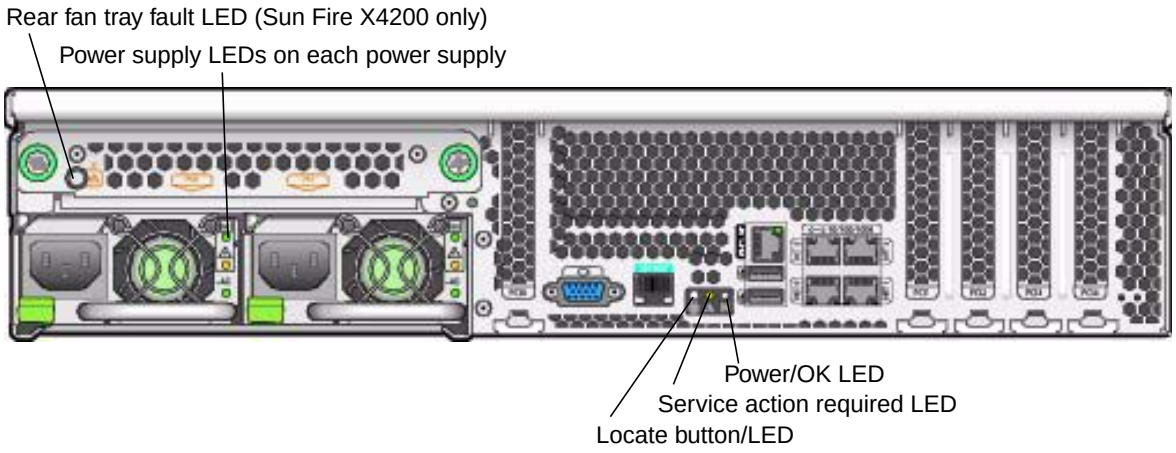

Rear fan tray fault LED (Sun Fire X4200 only)
Power supply LEDs on each power supply
Power/OK LED
Service action required LED
Locate button/LED

FIGURE C-2 Sun Fire X4200 Server Back Panel LEDs

TABLE C-2 Back Panel LED Functions

LED Name	Description
Rear Fan Tray Fault LED (The rear fan tray and the LED are present only in Sun Fire X4200 servers.)	This LED has two states: • Off: Fan module is operating properly. • Lit (amber): Fan tray has failed.
Power Supply Status LEDs.	The power supplies have three LEDs: • Top LED (green): Power supply is operating properly. • Middle LED (amber): Power supply failed. • Bottom LED (green): AC power to power supply is operating properly.

TABLE C-2 Back Panel LED Functions

LED Name	Description
Locate button/LED (Same function as on front panel.)	This LED helps you to identify which system in the rack you are working on in a rack full of servers. • Push and release this button to make the Locate LED blink for 30 minutes. • Hold down the button for 5 seconds to initiate a "push-to-test" mode that illuminates all other LEDs both inside and outside of the chassis for 15 seconds.
Service Action Required LED (Same function as on front panel.)	This LED has two states: • Off: Normal operation. • Slow Blinking: An event that requires a service action has been detected.
Power/OK LED (Same function as on front panel.)	This LED has three states: • Off: Server main power and standby power are off. • Blinking: Server is in standby power mode, with AC power applied to only the GRASP board and the power supply fans. • On: server is in main power mode with AC power supplied to all components.

C.2 Internal Status Indicator LEDs

The Sun Fire X4100 and Sun Fire X4200 servers have internal status indicator LEDs for the fan modules, the DIMM slots, the CPUs, and the GRASP board. FIGURE C-3 shows the locations of the internal LEDs. TABLE C-3 describes the LED behavior.

Note – To see the CPU LEDs, the GRASP board LED, or the LEDs in the ejector levers of the DIMM slots, you must put the server in standby power mode (shut down with the front panel Power button, but do not disconnect the AC power cords).

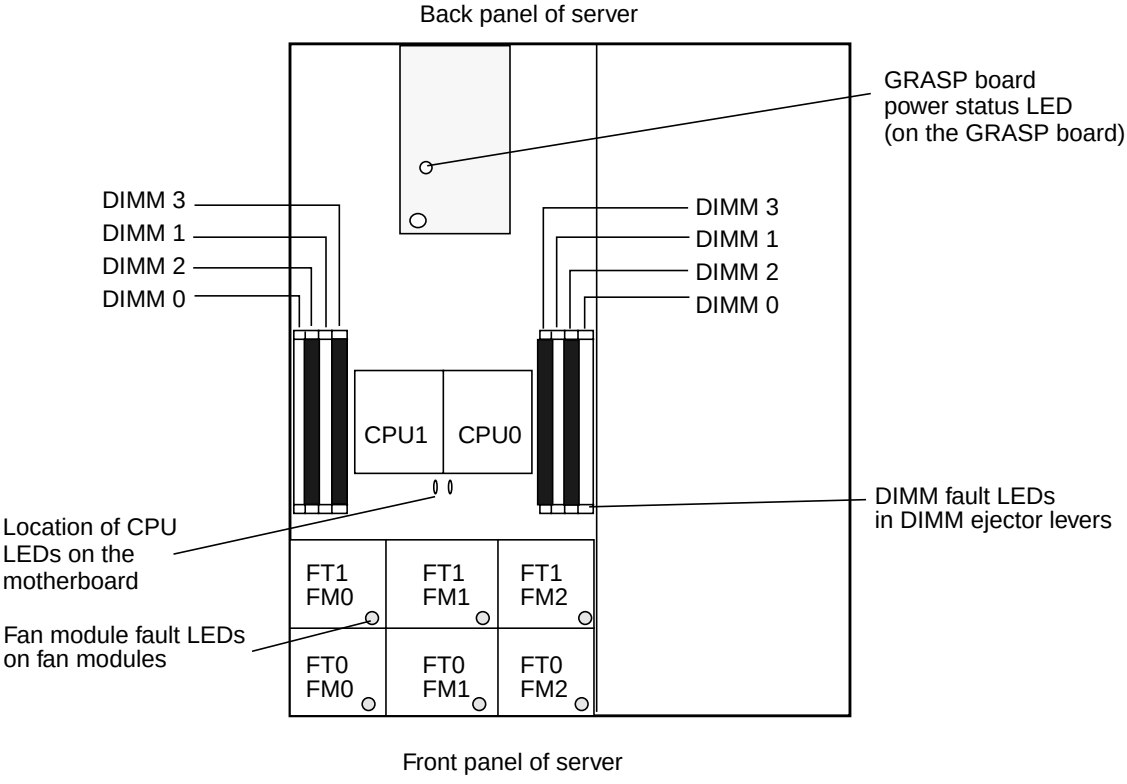


FIGURE C-3 Sun Fire X4100 and Sun Fire X4200 Internal Status LED Locations

TABLE C-3 Internal LED Functions

LED Name	Description
DIMM Fault LED (The ejector levers on the DIMM slots are the LEDs.)	This LED has two states: • Off: DIMM is operating properly. • Lit (amber): DIMM has failed.
CPU Fault LED (on motherboard)	This LED has two states: • Off: CPU is operating properly. • Lit (amber): CPU has encountered a voltage or heat error condition.
Fan Module Fault LED	This LED has two states: • Off: Fan module is operating properly. • Lit (amber): Fan module has failed.
GRASP Board Power Status LED	This LED has two states: • Off: standby power is not reaching the GRASP board. • Lit (green): 3.3V standby power is reaching the GRASP board.

APPENDIX **D**

Connector Pinouts

This appendix contains information about the connector pinouts, which are the same for both the Sun Fire X4100 and Sun Fire X4200 servers.

D.1 USB Connector

The USB connector pins and their corresponding descriptions are shown in the figure and table in this section.

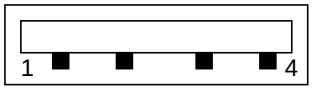


FIGURE D-1 USB Connector

TABLE D-1 USB Connector Pinouts

Pin Number	Pin Name	Description
1	+5V	+5V supply
2	Data-	Negative side of differential for data
3	Data+	Positive side of differential for data
4	Gnd	Ground

Note – The maximum output supply current for each USB port on the server is 500mA.

D.2 Serial Connector

The RJ-45 Serial connector pins and their corresponding descriptions are shown in the figure and table in this section.

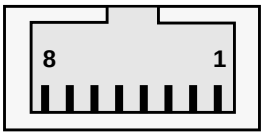


FIGURE D-2 Serial Connector

TABLE D-2 Serial Connector Pinouts

Pin Number	Pin Name	Description
1	RTS	Ready to send
2	DTR	Data terminal ready
3	TXD	Transmit data
4	GND	Ground
5	GND	Ground
6	RXD	Receive data
7	DSR	Data send ready
8	CTS	Clear to send

D.3 10/100BASE-T Connector

The RJ-45 10/100BASE-T (Net Management) connector pins and their corresponding descriptions are shown in the figure and table in this section.

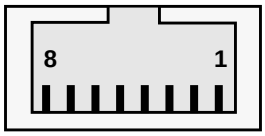


FIGURE D-3 10/100BASE-T Connector

TABLE D-3 10/100BASE-T Connector Pinouts

Pin Number	Pin Name	Description
1	TX+	Positive side of transmit data
2	TX-	Negative side of transmit data
3	RX+	Positive side of receive data
4	NC	No connect
5	NC	No connect
6	RX-	Negative side of receive data
7	NC	No connect
8	NC	No connect

D.4 10/100/1000BASE-T Connector

The RJ45 10/100/1000BASE-T connector pins and their corresponding descriptions are shown in the figure and table in this section.

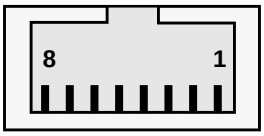


FIGURE D-4 10/100/1000BASE-T Connector

TABLE D-4 10/100/1000BASE-T Connector Pinouts

Pin Number	Pin Name	Description
1	TP0+	Positive side of data pair 0
2	TP0-	Negative side of data pair 0
3	TP1+	Positive side of data pair 1
4	TP2+	Positive side of data pair 2
5	TP2-	Negative side of data pair 2
6	TP1-	Negative side of data pair 1
7	TP3+	Positive side of data pair 3
8	TP3-	Negative side of data pair 3

D.5 VGA Video Connector

The VGA video connector pins and their corresponding descriptions are shown in the figure and table in this section.

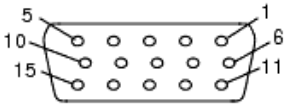


FIGURE D-5 VGA Video Connector

TABLE D-5 VGA Video Connector Pinouts

Pin Number	Pin Name	Description
1	RED	Red video
2	GRN	Green video
3	BLU	Blue video
4	ID2	ID2 (no connect)
5	GND	Ground
6	R_GND	Red video return (ground)
7	G_GND	Green video return (ground)
8	B_GND	Blue video return (ground)
9	KEY	No pin
10	S_GND	Sync return (ground)
11	ID0	ID0 (no connect)
12	ID1/SDA	MONID1
13	HSYNC	Horizontal sync
14	VSYNC	Vertical sync
15	ID3/SCL	MONID2

D.6 Serial Attached SCSI Connector

The Serial Attached SCSI (SAS) connector pins and their corresponding descriptions are shown in the figure and table in this section.

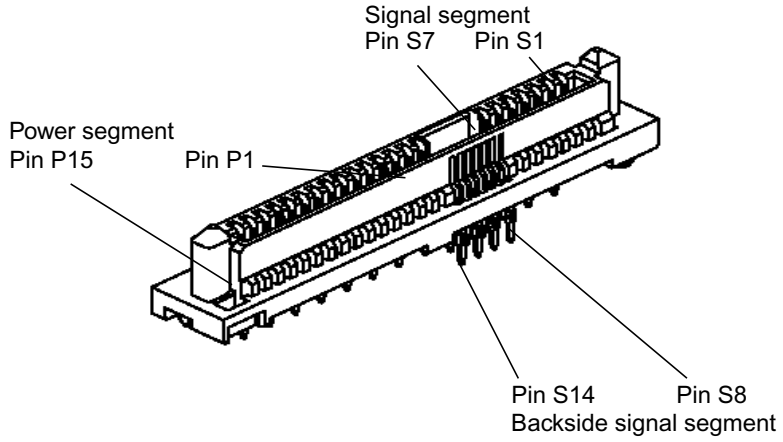


FIGURE D-6 Serial Attached SCSI Connector

TABLE D-6 Serial Attached SCSI Connector Pinouts

Segment	Pin Number	Pin Name	Description
Signal Segment	S1	Gnd	Second mate ground
	S2	TX+	Positive side of transmit to hard drive
	S3	TX-	Negative side of transmit to hard drive
	S4	Gnd	Second mate ground
	S5	RX-	Negative side of receive from hard drive
	S6	RX+	Positive side of receive from hard drive
	S7	Gnd	Second mate ground

TABLE D-6 Serial Attached SCSI Connector Pinouts *(Continued)*

Segment	Pin Number	Pin Name	Description
Backside Signal Segment	S8	Gnd	Second mate ground
	S9		Not used
	S10		Not used
	S11	Gnd	Second mate ground
	S12		Not used
	S13		Not used
	S14	Gnd	Second mate ground
Power Segment	P1	3.3 V	Not used
	P2	3.3 V	Not used
	P3	3.3 V	Not used
	P4	Gnd	First mate ground
	P5	Gnd	Second mate ground
	P6	Gnd	Second mate ground
	P7	5.0 V	Pre-charge, second mate
	P8	5.0 V	Third mate 5 V
	P9	5.0 V	Third mate 5 V
	P10	Gnd	Second mate ground
	P11	Reserved	Not used
	P12	Gnd	First mate ground
	P13	12.0 V	Pre-charge, second mate
	P14	12.0 V	Third mate 12 V
	P15	12.0 V	Third mate 12 V

D.7 Flex Cable Motherboard Connector

The flex cable (flex circuit) motherboard connector pins and their corresponding descriptions are shown in the figure and table in this section.

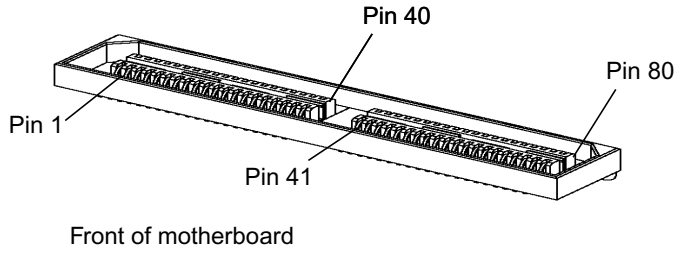


FIGURE D-7 Flex Cable Motherboard Connector

TABLE D-7 Flex Cable Motherboard Connector Pinouts

Pin Number	Signal Name
1	DVD_DRST_L
2	PS1_PRESENT_L
3	DVD_DDATA[8]
4	SAS_FAN_PRSNT_L
5	DVD_DDATA[7]
6	SAS_FAN_TACH
7	DVD_DDATA[9]
8	PS1_VIN_GOOD
9	DVD_DDATA[6]
10	PS1_POWEROK
11	DVD_DDATA[10]
12	SP_I2C_DAT
13	DVD_DDATA[5]

TABLE D-7 Flex Cable Motherboard Connector Pinouts *(Continued)*

Pin Number	Signal Name
14	SP_I2C_CLK
15	DVD_DDATA[11]
16	GND
17	DVD_DDATA[4]
18	+3.3 V AUX
19	DVD_DDATA[12]
20	PS0_PRESENT_L
21	DVD_DDATA[3]
22	PS0_ENABLE_L
23	DVD_DDATA[13]
24	SAS_FAN_LED_L
25	DVD_DDATA[2]
26	PS0_VIN_GOOD
27	DVD_DDATA[14]
28	PS0_POWEROK
29	DVD_DDATA[1]
30	DVD_DDACK_L
31	DVD_DDATA[15]
32	DVD_DRDY
33	DVD_DDRQ
34	DVD_INT_L
35	DVD_DDATA[0]
36	GND
37	DVD_DIOR_L
38	SAS_DISK3_RX_P
39	DVD_DIOW_L
40	SAS_DISK3_RX_N
41	DVD_DADDR[1]
42	SAS_DISK1_RX_P
43	DVD_PDIAG_L

TABLE D-7 Flex Cable Motherboard Connector Pinouts *(Continued)*

Pin Number	Signal Name
44	SAS_DISK1_RX_N
45	DVD_DADDR[0]
46	GND
47	DVD_DADDR[2]
48	SAS_DISK3_TX_P
49	DVD_DCS1_L
50	SAS_DISK3_TX_N
51	DVD_DCS3_L
52	GND
53	DVD_DASP_L
54	SAS_DISK1_TX_P
55	+5V
56	SAS_DISK1_TX_N
57	GND
58	GND
59	SAS_DISK2_TX_N
60	+5V
61	SAS_DISK2_TX_P
62	GND
63	GND
64	GND
65	SAS_DISK2_TX_N
66	DISK3_ACT_LED_L
67	SAS_DISK0_TX_P
68	SPINDLE_ID0
69	GND
70	DISK2_ACT_LED_L
71	SAS_DISK2_RX_N
72	DISK1_ACT_LED_L
73	SAS_DISK2_RX_P

TABLE D-7 Flex Cable Motherboard Connector Pinouts *(Continued)*

Pin Number	Signal Name
74	DISK0_ACT_LED_L
75	GND
76	SPINDLE_ID1
77	SAS_DISK0_RX_N
78	GND
79	SAS_DISK0_RX_P
80	PS_KILL

D.8 Flex Cable Power Distribution Board Connector

The power distribution board (PDB) brings power from the chassis power supplies to the motherboard. The main power connection to the motherboard is through two bus bars. The PS_KILL signals for the power supplies is grounded on the PDB to permanently enable the AUX output. The flex cable power distribution board (PDB) connector pins and their corresponding descriptions are shown in the figure and table in this section.

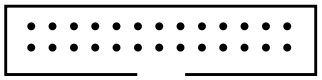


FIGURE D-8 Flex Cable PDB Connector

TABLE D-8 Flex Cable PDB Connector Pinouts

Pin Number	Signal Name
1	PS1_PRESENT_L
2	PS1_ENABLE_L
3	SAS_FAN_TACH
4	PS1_VIN_GOOD
5	SAS_FAN_PRSNT_L
6	PS1_POWEROK
7	PDB_I2C_DAT
8	PS_KILL
9	PDB_I2C_CLK
10	+3.3V AUX
11	GND
12	+3.3V AUX
13	GND
14	+3.3V AUX

TABLE D-8 Flex Cable PDB Connector Pinouts *(Continued)*

Pin Number	Signal Name
15	PS0_PRESENT_L
16	PS0_ENABLE_L
17	SAS_FAN_LED_L
18	PS0_VIN_GOOD
19	No connect
20	PS0_POWEROK
21	GND
22	FUSED_12V
23	GND
24	FUSED_12V
25	GND
26	FUSED_12V

D.9 Flex Cable DVD-ROM Drive Connector

The flex cable DVD-ROM drive IDE connector pins and their corresponding descriptions are shown in the figure and table in this section.

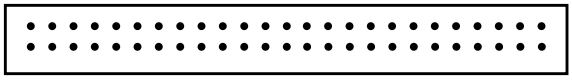


FIGURE D-9 Flex Cable DVD-ROM Drive IDE Connector

TABLE D-9 Flex Cable DVD-ROM Drive IDE Connector Pinouts

Pin Number	Signal Name
1	Audio L-CH (not supported)
2	Audio R-CH (not supported)
3	Audio Ground
4	Ground
5	RESET_L
6	DD8
7	DD7
8	DD9
9	DD6
10	DD10
11	DD5
12	DD11
13	DD4
14	DD12
15	DD3
16	DD13
17	DD2
18	DD14

TABLE D-9 Flex Cable DVD-ROM Drive IDE Connector Pinouts *(Continued)*

Pin Number	Signal Name
19	DD1
20	DD15
21	DD0
22	DMARQ
23	Ground
24	DIOR_L
25	DIOW_L
26	Ground
27	IORDY
28	DMACK_L
29	INTRQ
30	IOCS16_L
31	DA1
32	PDIAG_L
33	DA0
34	DA2
35	CS1FX_L
36	CS3FX_L
37	DASP_L
38	+5V (Motor)
39	+5V (Motor)
40	+5V (Motor)
41	+5V (Logic)
42	+5V (Logic)
43	Ground
44	Ground
45	Ground
46	Ground
47	Dev Config (CSEL)

TABLE D-9 Flex Cable DVD-ROM Drive IDE Connector Pinouts *(Continued)*

Pin Number	Signal Name
48	Ground
49	Vendor Unique
50	Vendor Unique

D.10 Motherboard Bus Bar Power Connector

Main power is delivered to the motherboard through a bus bar. There are two pads on the bottom side of the motherboard that connect +12 V and ground. The pads have been designed to handle 50 A. The motherboard bus bar connector pads and their corresponding descriptions are shown in the figure and table in this section.

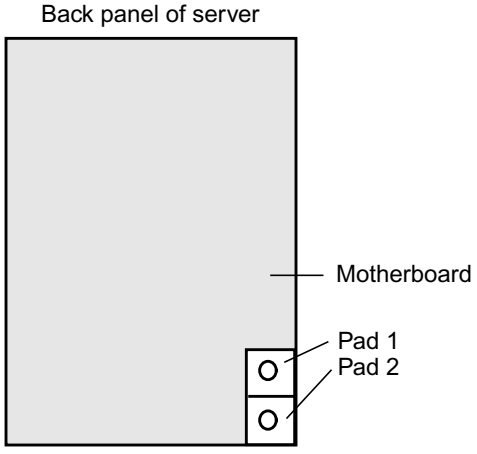


FIGURE D-10 Motherboard Bus Bar Connector

TABLE D-10 Motherboard Bus Bar Connector Pinouts

Pad Number	Pad Name	Description
1	+12V	+12 V DC power to motherboard
2	GND	Ground

D.11 Front I/O Interconnect Cable Connector

The connection from the motherboard to the front I/O board is made through a short interconnect ribbon cable. On each board, there is a connector, Samtec STMM-113-02-S-D. The interconnect cable connector pins and their corresponding descriptions are shown in the figure and table in this section.

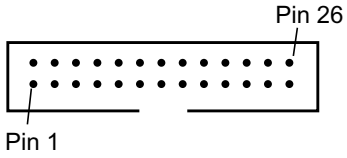


FIGURE D-11 Front I/O Interconnect Cable Connector

TABLE D-11 Front I/O Interconnect Cable Connector Pinouts

Pin Number	Signal Name
1	FAN_CTL0
2	FAN_CTL3
3	FAN_CTL1
4	FAN_CTL4
5	FAN_CTL2
6	FAN_CTL5
7	GND
8	GND
9	FRONT_USB2_N
10	FRONT_USB2_P
11	GND
12	GND
13	FRONT_LOCATE_L
14	+5 V
15	GND
16	GND

TABLE D-11 Front I/O Interconnect Cable Connector Pinouts *(Continued)*

Pin Number	Signal Name
17	+5 V
18	+3.3 V AUX
19	GND
20	INTRUSION_SW
21	SP_I2C_CLK
22	POWER_BUTTON_L
23	SP_I2C_DAT
24	FRONT_IO_INT_L
25	FR_IO_PRESENT_L
26	VDD_RTC

D.12 Power Supply Connector

The power supply connector pins and their corresponding descriptions are shown in the figure and table in this section.

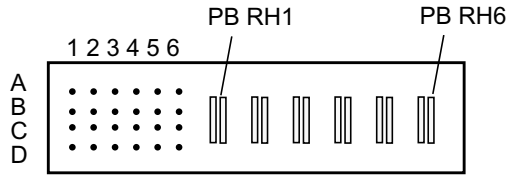


FIGURE D-12 Power Supply Connector

TABLE D-12 Power Supply Connector Pinouts

Pin Number	Pin Name	Description
PB RH1	+12V RET	Main Power Return
PB RH2	+12V RET	Main Power Return
PB RH3	+12V RET	Main Power Return
PB RH4	+12V	+12 V Power Output
PB RH5	+12V	+12 V Power Output
PB RH6	+12V	+12 V Power Output
A1	PS_KILL	Turns off both main and standby outputs
A2	Current Share	Current share signal
A3	Return	Ground
A4	+3.3V SB	+3.3 V Standby Output
A5	PS A0	EEPROM Address Bit 0 Input
A6	+3.3V SB	+3.3 V Standby Output
B1	Return	Ground
B2	Fan_Cntl	Analog fan control voltage input
B3	Return	Ground
B4	+3.3V SB	+3.3 V Standby Output

TABLE D-12 Power Supply Connector Pinouts *(Continued)*

Pin Number	Pin Name	Description
B5	SDA	EEPROM Serial Data I/O
B6	-PS_ON	Enable for main supply output
C1	Return	Ground
C2	Tach _1	Fan tach output (2 pulses per rev)
C3	Return	Ground
C4	+3.3V SB	+3.3 V Standby Output
C5	SCL	EEPROM Serial Clock Input
C6	VIN_GOOD	Input voltage above minimum spec
D1	-PS_Present	Present–active low (PU)
D2	NC	No Connect (Tach_2 if two-fan design)
D3	Return	Ground
D4	+3.3V SB	+3.3 V Standby Output
D5	S_INT(Alert)	Intrusion switch alert
D6	POK	Output voltages within spec (PU)

D.13 Fan Module Connector

The fan module connectors and their corresponding descriptions are shown in the figure and table in this section.

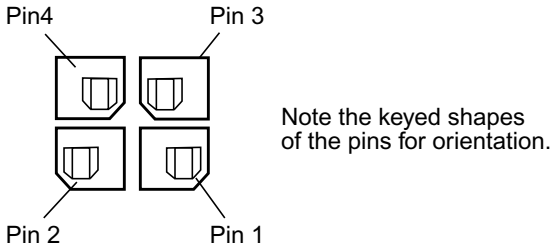


FIGURE D-13 Fan Module Connector

Note – Fan modules in Sun Fire X4100 servers each contain two 40 mm fans (Fan A and Fan B); fan modules in Sun Fire X4200 servers each contain one 80 mm fan (Fan A). The same connector is used for both types of fan modules, with slightly different assignments to connector pins, as shown in TABLE D-13.

TABLE D-13 Fan Module Connector Pinouts

Pin Number	Pin Name	Description
1	+12V	+12 V power to Fan A (and to Fan B in Sun Fire X4100 fan modules)
2	GND	Ground for Fan A (and for Fan B in Sun Fire X4100 fan modules)
3	Fan A Tach	Fan A tachometer sensor
4	Fan B Tach	Fan B tachometer sensor for Sun Fire X4100 fan modules; Presence sensor (tied to Pin 2) for Sun Fire X4200 fan modules

APPENDIX **E**

Serial Attached SCSI BIOS Configuration Utility

This appendix explains how to use the LSI Logic Fusion-MPT Serial Attached SCSI (SAS) BIOS Configuration Utility. This appendix contains the following sections:

- Section E.1, “Fusion-MPT SAS BIOS Overview” on page E-2
- Section E.2, “Starting the SAS BIOS Configuration Utility” on page E-3
- Section E.3, “Configuration Utility Screens” on page E-4
- Section E.4, “Performing RAID Configuration Tasks” on page E-41

E.1 Fusion-MPT SAS BIOS Overview

The Fusion-MPT SAS BIOS features include:

- Configuration for up to 256 adapters; any four can be chosen for INT13 (bootrom) support
- Support for Message Passing Technology (MPT)
- Support for the LSI53C1064 devices
- Support for SAS devices

Note – At this time, the Sun Fire X4100 and Sun Fire X4200 servers are shipped with support for the SAS1064 controller only. SATA devices are not supported in these servers at this time.

- Support for Integrated RAID initialization (with proper firmware)

The SAS BIOS is the bootable ROM code that manages SAS hardware resources. It is specific to a family of LSI Logic Fusion-MPT SAS controllers or processors. The Fusion-MPT SAS BIOS integrates with a standard system BIOS, extending the standard disk service routine provided through INT13h.

During the boot time initialization, the SAS BIOS determines whether the system BIOS has already installed other hard disks, such as an IDE drive. If such drives are already installed, the SAS BIOS maps any SAS drives it finds behind these drives. Otherwise, the SAS BIOS installs drives starting with the system boot drive. In this case, the system boots from a drive controlled by the SAS BIOS. The LSI Logic SAS BIOS supports the BIOS Boot Specification (BBS).

E.1.1 Boot Initialization With BIOS Boot Specification (BBS)

The Fusion-MPT SAS BIOS supports the BIOS Boot Specification (BBS), which allows you to choose which device to boot from by selecting the priority.

To use this feature, the system BIOS must also be compatible with the BBS. If the system supports the BBS, you can use the system BIOS Setup menu to select the boot order and drive order. In the system BIOS Setup, the Boot Connection Devices menu lists the available boot options. Use that menu to select the device and rearrange the order. Then exit to continue the boot process.

E.2 Starting the SAS BIOS Configuration Utility

If you have SAS BIOS version 6.xx, and it includes the Fusion-MPT SAS BIOS Configuration Utility, you can change the default configuration of the SAS host adapters. You may decide to change these default values if there is a conflict between device settings or if you need to optimize system performance.

The version number of the SAS BIOS appears in a banner displayed on the computer monitor during bootup. If the utility is available, this message also appears during bootup:

```
Press Ctrl+C to start LSI Logic Configuration Utility...
```

This message remains on the screen for about five seconds, giving you time to start the utility. If you press Ctrl+C, the message changes to:

```
Please wait, invoking LSI Logic Configuration Utility...
```

After a brief pause, the computer monitor displays the Main menu of the Fusion-MPT SAS BIOS Configuration Utility. These messages may appear during the boot process:

- `Adapter removed from boot order!`

  This message appears when an adapter was removed from the system or was relocated behind a PCI bridge.

- `Adapter configuration may have changed, reconfiguration is suggested!`

  This message appears if none of the information in the NVRAM is valid.

- `Updating Adapter List!`

  This message appears when fewer than four adapters are in the boot order and more adapters exist than are shown.

Caution – The SAS BIOS Configuration Utility is a powerful tool. If, while using it, you somehow disable all of the controllers, press Ctrl+E (or Ctrl+A on versions earlier than 5.00) after memory initialization during reboot to re-enable and reconfigure the controllers.

Note – Some devices detected by the Configuration Utility cannot be controlled by the SAS BIOS. Devices such as tape drives and scanners require that a device driver specific to that device be loaded. However, the SAS BIOS Configuration Utility does allow you to modify parameters for these devices.

E.3 Configuration Utility Screens

All SAS BIOS Configuration Utility screens are partitioned into the following areas, starting at the top of the screen:

- **Header Area**: This area lists static information text, including the product title and version.
- **Menu Area**: This area lists the current screen title and controller information when on screens other than Adapter List.
- **Main Area**: This is the main area for presenting data. This area has a cursor for item selection, horizontal scrolling, and vertical scrolling. The horizontal and vertical scroll bars appear here if needed.
- **Footer Area**: This area provides general help information text.

Note – The screens shown in this appendix are examples. The version numbers and the screen items shown are subject to change over the life of the product.

E.3.1 User Input Keys

The general key inputs that are listed in TABLE E-1 apply on all screens of the SAS BIOS Configuration Utility.

TABLE E-1 User Input Keys

Key	Definition	Description
F1	Help	Context-sensitive help for the field in which the cursor is positioned.
Arrow keys	Move cursor	Up, down, left, right movement to position the cursor.
Home/End	Select item	Select the item in which the cursor is positioned.
+/-	Change item	Items with values in [ ] brackets are modifiable. Numeric keypad + and numeric keypad - update a modifiable field to its next relative value.
Esc	Abort/Exit	The Esc key aborts the current context operation and/or exits the current screen. The user is asked to confirm, if changes have been made.
Enter	Execute <*item*>	Executable items are indicated by highlighted text and a different background color. Press Enter to execute the item's associated function. Throughout the GUI, selections that are not currently permissible are grayed out. The behavior of executable items varies throughout the Configuration Utility.

E.3.2 Adapter List Screen

When you start the Fusion-MPT SAS BIOS Configuration Utility, the Adapter List appears, as shown in FIGURE E-1. This screen displays a scrolling list of up to 256 LSI Logic SAS host adapters in the system and information about each of them. TABLE E-2 describes the fields in this screen.

Use the arrow keys to select an adapter, then press Enter to view and modify the selected adapter's properties (and to access the other screens). After you select an adapter and press Enter, the adapter's devices are scanned and the Adapter Properties screen appears. See FIGURE E-3.

To change the Adapter boot order, use the -, +, Insert, and Delete keys while on the Boot Order field. Press Insert or Delete to add or remove an adapter to or from the boot order. Press the - and + keys to modify an adapter's position in the boot order. If you make changes to the boot order, the Configuration Utility prompts you to save the changes before you exit the screen.

From the Adapter List screen, you can also press Alt+N to access the Global Properties screen. See FIGURE E-2. On this screen you can change global scope settings.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Adapter List  Global Properties                                             *
* Adapter    PCI  PCI  PCI  PCI   FW Revision          Status    Boot          *
*            Bus  Dev  Fnc  Slot                                Order         *
* SAS1064    02   03   00   00    1.04.00.00-IR        Enabled   0             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Alt+N = Global Properties -/+ = Alter Boot Order  Ins/Del = Alter Boot List  *
*******************************************************************************
```

FIGURE E-1 Adapter List Screen

TABLE E-2 Adapter List Screen Field Descriptions

Field	Description
Adapter	The specific LSI Logic SAS controller type.
PCI Bus	The PCI Bus number (range 0x00 - 0xFF, 0 - 255 decimal) assigned by the system BIOS to an adapter.
PCI Dev	The PCI Device (range 0x00 - 0x1F, 0 - 31 decimal) assigned by the system BIOS to an adapter.
PCI Fnc	The PCI Function (range 0x00 - 0x7, 0 - 7 decimal) assigned by the system BIOS to an adapter.
PCI Slot	The PCI slot in which the controller is installed.
FW Revision	The Fusion MPT firmware version and type (IR or IT).
Status	Status indicates whether an adapter is eligible for LSI Logic software control, or whether it is reserved for control by non-LSI Logic software: • Enabled: The BIOS is either currently controlling the adapter or will attempt to control the adapter upon reload. • Disabled: The BIOS is either not controlling the adapter or will discontinue control of the adapter upon reload. Whether Enabled or Disabled, the user can still view and modify settings for the adapter. The Boot Support setting in the Adapter Properties menu can be used to change the status of this setting. The BIOS must be reloaded (the system must be rebooted) in order for a new Boot Support setting to take effect. • Error: The BIOS encountered a problem with the adapter. Adapter settings can be viewed and modified, but the available information and functionality may be limited.
Boot Order	The order in which adapters will boot when the system has more than one adapter. Up to four of the total adapters in a system may be selected as bootable. To add an adapter to the boot list, press Insert while on the Boot Order field. To remove an adapter from the boot list, press Delete while on the desired adapter's Boot Order field. Press the - or + keys to change the adapter's position in the boot order.

E.3.3 Global Properties Screen

To access the Global Properties screen, press Alt+N while on the Adapter List screen. To return to the Adapter List from Global Properties, press Alt+N again. FIGURE E-2 shows an example of the Global Properties screen. TABLE E-3 describes the fields in this screen.

```
*******************************************************************************
* Adapter List  Global Properties                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*      Pause When Boot Alert Displayed  [No]                                  *
*      Boot Information Display Mode    [Display adapters & installed devices] *
*      Support Interrupt                [Hook interrupt, the Default]          *
*                                                                             *
*      Restore Defaults                                                       *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Alt+N = Adapter List                                                        *
*******************************************************************************
```

FIGURE E-2 Global Properties Screen

TABLE E-3 Global Properties Screen Field Descriptions

Field	Description
Pause When Boot Alert Displayed	This option specifies whether the BIOS pauses for user acknowledgement after displaying an alert message during boot. To continue after displaying a message, select No. To wait for the user to press a key, select Yes.
Boot Information Display Mode	This option controls how much information the BIOS displays about adapters and devices during boot. Possible values are: • Display adapters only • Display adapters and all devices • Display minimal information • Display adapters & installed devices
Support Interrupt	This option allows you to prevent a hook on INT40, if required. Possible values are: • Hook interrupt (default) • Bypass interrupt hooks
Restore Defaults	Press Enter to restore the default settings.

E.3.4 Adapter Properties Screen

The Adapter Properties screen allows you to view and modify adapter settings. It also provides access to all other screens. FIGURE E-3 shows an example of the Adapter Properties screen. TABLE E-4 describes the fields of the screen.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Adapter Properties -- SAS1064                                               *
*                                                                             *
*           Adapter                         SAS1064                           *
*           PCI Slot                        00                                *
*           PCI Address(Bus/Dev/Func)       02:03:00                          *
*           MPT Firmware Revision           1.04.00.00-IR                     *
*           SAS Address                     50003BA0:000003BA                 *
*           Status                          Enabled                           *
*           Boot Order                      0                                 *
*           Boot Support                    [Enabled BIOS & OS]               *
*                                                                             *
*           RAID Properties                                                   *
*                                                                             *
*           SAS Topology                                                      *
*                                                                             *
*           Advanced Adapter Properties                                       *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Enter = Select Item   -/+ = Change Item                                     *
*******************************************************************************
```

FIGURE E-3 Adapter Properties Screen

TABLE E-4 Adapter Properties Screen Field Descriptions

Field	Description
Adapter	The specific LSI Logic SAS controller type.
PCI Slot	The PCI slot in which the controller is located.
PCI Address	The PCI address assigned to the adapter by the system BIOS. Bus value has range 0x00 - 0xFF, 0 - 255 decimal. Device value has range 0x00 - 0x1F, 0 - 31 decimal. Function has range 0x00 - 0x7, 0 - 7 decimal.
MPT Firmware Revision	The Fusion MPT firmware version and type (IR or IT).
SAS Address	The SAS Address assigned to this adapter.

TABLE E-4 Adapter Properties Screen Field Descriptions *(Continued)*

Field	Description
Status	Indicates whether an adapter is eligible for LSI Logic software control, or whether it is reserved for control by non-LSI Logic software: • Enabled: The BIOS is either currently controlling the adapter or will attempt to control the adapter upon reload. • Disabled: The BIOS is either not controlling the adapter or will discontinue control of the adapter upon reload. Whether Enabled or Disabled, the user can still view and modify settings for the adapter. The Boot Support setting in the Adapter Properties menu can be used to change the status of this setting. The BIOS must be reloaded (the system must be rebooted) in order for a new Boot Support setting to take effect. • Error: The BIOS encountered a problem with the adapter. Adapter settings can be viewed and modified, but the available information and functionality may be limited.
Boot Order	The order in which adapters will boot when the system has more than one adapter. Up to four of the total adapters in a system may be selected as bootable.
Boot Support	Indicates whether an adapter is eligible for LSI Logic software control or whether it is reserved for control by non-LSI Logic software. The options are: • Enabled BIOS & OS (default): Both the BIOS and OS driver will control the adapter. • Enabled BIOS Only: The BIOS will control the adapter; OS drivers will not control it. Some OS drivers do not support this setting. For example, there is no way to disable an adapter in a Windows driver. • Enabled OS Only: The BIOS will not control the adapter; the OS driver will control the adapter. • Disabled: The BIOS will not control the adapter when loaded. However, the adapter will still be visible through the Configuration Protocol. Changes to this setting are reflected in the Status field on the main Adapter List menu. The new setting does not take effect until the BIOS is reloaded (that is, until the system is rebooted).
RAID Properties	Press Enter on this field to access this screen.
SAS Topology	Press Enter on this field to access this screen.
Advanced Adapter Properties	Press Enter on this field to access this screen.

E.3.5 SAS Topology Screen

The SAS Topology screen presents a view of the adapter's SAS hierarchy, as shown in FIGURE E-4. You can scroll right to view additional information about the devices (see FIGURE E-5 through FIGURE E-8.) Descriptions of the fields are given in TABLE E-5.

The SAS Topology screen shows the following objects and their significant properties:

- Adapter
- PHYs
- Attached Devices
- Expanders/Enclosures

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* SAS Topology -- SAS1064                                                     *
*                    Device Identifier              Discovery   Device        *
* SAS1064(02:03:00)                                 Status      Info          *
* * PHY  0                                          Good                      *
* * PHY  1                                          Good                      *
* * PHY  2           SEAGATE ST936701LSUN36G 0456   Good        SAS           *
* * PHY  3           SEAGATE ST973401LSUN72G 0356   Good        SAS           *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc=Exit   F1=Help   Alt+M=More Keys                                        *
* Alt+D=Device Properties   Alt+E=Expander Properties                         *
*******************************************************************************
```

FIGURE E-4 SAS Topology Screen

To expand the SAS Topology display, select an expander or enclosure and press Enter to display all its PHYs/devices/bays. To collapse the display, press Enter again.

While the cursor is on the Device Identifier you can perform these actions:

- Press Alt+E to access a specific Expander Properties screen or press Alt+D to access a specific Device Properties screen.
- Press Enter while on an expander or enclosure to expand or collapse the display.
- Press Enter while on a device to activate the Locate LED.

At any time while on the screen press C to clear Device Mappings for non-present devices. Scroll the cursor to the right to display further information (see FIGURE E-5 through FIGURE E-8).

```
*******************************************************************************
* SAS Topology -- SAS1064                                                     *
*                    Device Identifier               Negotiated Link          *
* SAS1064(02:03:00)                                  Speed(Gbps)              *
* * PHY  0                                          Unknown                  *
* * PHY  1                                          Unknown                  *
* * PHY  2           SEAGATE ST936701LSUN36G 0456    3.0                      *
* * PHY  3           SEAGATE ST973401LSUN72G 0356    3.0                      *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc=Exit   F1=Help   Alt+M=More Keys                                        *
* Alt+D=Device Properties   Alt+E=Expander Properties                         *
*******************************************************************************
```

FIGURE E-5 SAS Topology Screen 2, Negotiated Link Speed

```
*******************************************************************************
* SAS Topology -- SAS1064                                                     *
*                    Device Identifier              Maximum Link              *
* SAS1064(02:03:00)                                 Speed(Gbps)               *
* * PHY  0                                          3.0                       *
* * PHY  1                                          3.0                       *
* * PHY  2           SEAGATE ST936701LSUN36G 0456   3.0                       *
* * PHY  3           SEAGATE ST973401LSUN72G 0356   3.0                       *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc=Exit   F1=Help   Alt+M=More Keys                                        *
* Alt+D=Device Properties   Alt+E=Expander Properties                         *
*******************************************************************************
```

FIGURE E-6 SAS Topology Screen 3, Maximum Link Speed

```
*******************************************************************************
* SAS Topology -- SAS1064                                                     *
*                    Device Identifier              Target                    *
* SAS1064(02:03:00)                                 Capabilities              *
* * PHY  0                                                                    *
* * PHY  1                                                                    *
* * PHY  2           SEAGATE ST936701LSUN36G 0456   SSP                       *
* * PHY  3           SEAGATE ST973401LSUN72G 0356   SSP                       *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc=Exit   F1=Help   Alt+M=More Keys                                        *
* Alt+D=Device Properties   Alt+E=Expander Properties                         *
*******************************************************************************
```

FIGURE E-7 SAS Topology Screen 4, Target Capabilities

```
*******************************************************************************
* SAS Topology -- SAS1064                                                     *
*                    Device Identifier              Initiator                 *
* SAS1064(02:03:00)                                 Capabilities              *
* * PHY  0                                                                    *
* * PHY  1                                                                    *
* * PHY  2           SEAGATE ST936701LSUN36G 0456                             *
* * PHY  3           SEAGATE ST973401LSUN72G 0356                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc=Exit   F1=Help   Alt+M=More Keys                                        *
* Alt+D=Device Properties   Alt+E=Expander Properties                         *
*******************************************************************************
```

FIGURE E-8 SAS Topology Screen 5, Initiator Capabilities

TABLE E-5 SAS Topology Screens Field Descriptions

Field	Description
Device Identifier	The ASCII device identifier string extracted from the device's inquiry data.
Discovery Status	The status of SAS topology discovery on this directly attached PHY or on an expander. This field is only an indicator of an error being encountered. For specific details and the error value, see the Expander Properties page for expanders and the PHY Properties page for directly attached PHYs.
Device Info	Indicates whether a device is SAS or SATA, and whether the device has been selected as the boot device. (SATA is not supported on Sun Fire X4100 or Sun Fire X4200 servers at this time.)
Negotiated Link Speed	The negotiated link speed for this PHY, in Gbits/s. This field also indicates whether the PHY has been disabled.

TABLE E-5 SAS Topology Screens Field Descriptions *(Continued)*

Field	Description
Maximum Link Speed	The maximum hardware link rate possible for this PHY, in Gbits/s.
Target Capabilities	The target capabilities for this device. The following acronyms are used: • SSP - Serial SCSI Protocol • SMP - Serial Management Protocol
Initiator Capabilities	The initiator capabilities for this device. The following acronyms are used: • SSP - Serial SCSI Protocol • SMP - Serial Management Protocol

E.3.6 Device Properties Screen

The Device Properties screen displays information about a specific device, as shown in FIGURE E-9. To access this screen, press Alt+D on the SAS Topology screen when the cursor is on the Device Identifier field of a device.

Press Alt+N or Alt+P at any time while on this screen to cycle to the next or previous device.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Device Properties -- SAS1064                                                *
*                                                                             *
*                                                                             *
*           Device Identifier   SEAGATE ST936701LSUN36G 0456                  *
*           Scan Order          2                                             *
*           Device Information  SAS                                           *
*           SAS Address         5000C500:001047C9                             *
*           Serial Number       39000SZC            3LC                       *
*                                                                             *
*           Verify                                                            *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc=Exit   F1=Help   Alt+M=More Keys                                        *
* Alt+N = Next Device    Alt+P = Previous Device    Enter = Select Item       *
*******************************************************************************
```

FIGURE E-9 Device Properties Screen

TABLE E-6 Device Properties Screen Field Descriptions

Field	Description
Device Identifier	The ASCII device identifier string extracted from the device's inquiry data.
Scan Order	The scan order for this device. This is the equivalent of a SCSI ID in parallel SCSI.
Device Information	Indicates whether the device is SAS or SATA. (SATA is not supported on Sun Fire X4100 or Sun Fire X4200 servers at this time.)

TABLE E-6 *(Continued)*Device Properties Screen Field Descriptions

Field	Description
SAS Address	The SAS address of this device.
Serial Number	The serial number of this device.
Verify	Press Enter to access the Verify All Sectors screen. From this screen you can start a verification of all sectors on the device (see Section E.3.7, "Device Verify Screen" on page E-19). If needed, you can reassign defective Logical Block Addresses (LBAs), as described in the text following TABLE E-7.

E.3.7 Device Verify Screen

To access the Device Verify screen, press Enter on the appropriate field on the Device Properties screen. This screen includes an Elapsed Time and status bar, which begins incrementing when the operation is started and which shows the current progress of the operation.

When the Device Verify screen appears (see FIGURE E-10), press Enter to begin the verify process. You may press Esc at any time to cancel the verify process. TABLE E-7 describes the fields of the screen.

* Device Verify -- SAS1064
Device Identifier SEAGATE ST936701LSUN36G 0456
SAS Address 5000C500:001047C9
Serial Number 39000SZC 3LC
All sectors on the device will be verified.
Press Enter to continue or any other key to cancel.
Elapsed Time: 00:00:00
Percent
Complete 0% 100%
* Esc=Exit F1=Help Alt+M=More Keys

FIGURE E-10 Device Verify Screen

TABLE E-7 Device Verify Screen Field Descriptions

Field	Description
Device Identifier	The ASCII device identifier string extracted from the device's inquiry data.
SAS Address	The SAS address of this device.

TABLE E-7 *(Continued)*Device Verify Screen Field Descriptions

Field	Description
Serial Number	The serial number of this device.
Elapsed Time	The total time elapsed since the Format or Verify operation started.
Percent Complete	Graphical status bar that shows the current completion status of the operation.

If the Logical Block Addresses (LBAs) can be reassigned, or need to be reassigned, the following prompt appears:

```
Reassign the block?
(Yes, No, All, nonE, Cancel)
```

The reassignment options are as follows:

- Yes: Reassign only this block. If another block needs to be reassigned in the future, display the prompt again.
- No: Do not reassign this block. If another block needs to be reassigned in the future, display the prompt again.
- All: Reassign the current block, and automatically reassign other blocks that need it, without displaying the prompt again.
- nonE: Do not reassign the current block, and do not automatically reassign any other blocks that need it. Do not display the prompt again.
- Cancel: Do not reassign anything, and stop the verification process.

E.3.8 Advanced Adapter Properties Screen

The Advanced Adapter Properties screen (see FIGURE E-11) allows you to view and modify infrequently accessed adapter settings. TABLE E-8 describes the fields of the screen.

The Advanced Adapter Properties screen provides access to advanced Device Properties and PHY Properties. To modify the Link Error Settings Threshold Count and Threshold Time, press Enter while the cursor is on the desired field and type the new value.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Advanced Adapter Properties -- SAS1064                                      *
*                                                                             *
*           IRQ                          0B                                   *
*           NVM                          Yes                                  *
*           IO Port Address              A800                                 *
*           Chip Revision ID             02                                   *
*                                                                             *
*           Spinup Delay (Secs)          [ 2]                                 *
*           CHS Mapping                  [SCSI Plug and Play Mapping]         *
*                                                                             *
*           Link Error                   Threshold  Threshold                 *
*           Settings                     Count      Time(Secs)                *
*           Invalid DWORDs                 0             0                  *
*           Loss of DWORD Sync             0             0                  *
*           Running Disparity Errors       0             0                  *
*           PHY Reset Errors               0             0                  *
*                                                                             *
*           Advanced Device Properties                                        *
*           PHY Properties                                                    *
*           Restore Defaults                                                  *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Enter = Select Item   -/+ = Change Item                                     *
*******************************************************************************
```

FIGURE E-11 Advanced Adapter Properties Screen

TABLE E-8 Advanced Adapter Properties Screen Field Descriptions

Field	Description
IRQ	The Interrupt Request Line used by the adapter. The system BIOS assigns this value.
NVM	Indicates whether an adapter has nonvolatile memory (NVM) associated with it. An adapter's configuration is stored in its associated NVM.
IO Port Address	The I/O Port Address used to communicate with the adapter. The system BIOS assigns this number.
Chip Revision ID	The Revision ID of this adapter.
Spinup Delay	The number of seconds to wait between spinups of devices attached to this adapter. Staggered spinups balance the total electrical current load on the system during boot. The default value is 2 seconds, with choices between 1 and 10 seconds.
CHS Mapping	Defines how the Cylinder Head Sector values are mapped onto a disk without pre-existing partition information. CHS Mapping allows two settings: • SCSI Plug and Play Mapping (default) automatically determines the most efficient and compatible mapping. • Alternate CHS Mapping utilizes an alternate, possibly less efficient, mapping that may be required if a device is moved between adapters from different vendors. **Note:** Neither of these options has any effect after a disk has been partitioned using the FDISK command. To change the CHS Mapping on a partitioned disk, use the FDISK command to delete all partitions. Then reboot the system to clear memory. Otherwise, the old partitioning data will be reused.
Link Error Settings	• Invalid DWORDs: The number of invalid dwords that have been received, outside of PHY reset sequences, since the last PHY Link Error Reset. • Loss of DWORD Sync: The number of times, since the last PHY Link Error Reset, that DWORD synchronization was lost and the link reset sequence occurred. • Running Disparity Errors: The number of DWORDS with running disparity errors that have been received, outside of PHY reset sequences, since the last PHY Link Error Reset. • PHY Reset Errors: The number of times the PHY reset sequence has failed, since the last PHY Link Error Reset.
Threshold Count	Link error count threshold values. When a Link Error Count exceeds a Threshold Count within the Threshold Time (secs) the Fusion-MPT FW may reduce the link rate. Press Enter on any of these fields to modify the value.

TABLE E-8 *(Continued)*Advanced Adapter Properties Screen Field Descriptions

Field	Description
Threshold Time (secs)	Time, in seconds, over which to apply the Threshold Count. When a Link Error Count exceeds a Threshold Count within the Threshold Time (secs) the Fusion-MPT FW may reduce the link rate. Press Enter on any of these fields to modify the value.
Advanced Device Properties	Press Enter to view and modify Advanced Device Properties (see Section E.3.9, "Advanced Device Properties Screen" on page E-24).
PHY Properties	Press Enter to view and modify PHY properties (see Section E.3.10, "PHY Properties Screen" on page E-28).
Restore Defaults	Press Enter to restore the default values for all items on this screen.

E.3.9 Advanced Device Properties Screen

The Advanced Device Properties screen (FIGURE E-12) allows you to view and modify infrequently accessed device settings. TABLE E-9 describes the fields of the screen.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Advanced Device Properties -- SAS1064                                       *
*                                                                             *
*           Maximum INT 13 devices for this adapter    24                     *
*           Maximum Target device spinups               1                     *
*                                                                             *
*           IO Timeout for Block Devices                10                    *
*           IO Timeout for Block Devices(Removable)     10                    *
*           IO Timeout for Sequential Devices           10                    *
*           IO Timeout for Other devices                10                    *
*                                                                             *
*           LUNs to Scan for Block Devices             [All]                  *
*           LUNs to Scan for Block Devices(Removable)  [All]                  *
*           LUNs to Scan for Sequential Devices        [All]                  *
*           LUNs to Scan for Other Devices             [All]                  *
*                                                                             *
*           Removable Media support                    [None]                 *
*                                                                             *
*           Restore Defaults                                                  *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Enter = Select Item   -/+ = Change Item                                     *
*******************************************************************************
```

FIGURE E-12 Advanced Device Properties Screen

TABLE E-9 Advanced Device Properties Screen Field Descriptions

Field	Description
Maximum INT 13 devices for this adapter	The maximum number of devices attached to the adapter for which to install a pre-OS I/O interface. The specified number of devices in the adapter's device scan order list will have an I/O interface installed. (An installed I/O interface is defined as INT 13H.) X86 platforms allow a maximum of 24 INT 13h devices per system. Therefore, fewer than the specified number of INT 13h devices may be installed. The default for X86 is 24 devices, with a range of 0-24 allowed.
Maximum target device spinups	The maximum number of targets that can simultaneously spin up. The IOC must delay by the time indicated in the spin-up delay field before it starts spin-up of the next set of targets. A value of 0 in this field is treated the same as a value of 1.
IO Timeout for Block Devices	The time, in seconds, (0-999, 0 = no-time-out) that the host uses to timeout I/Os for the following devices with nonremovable media: • SCSI Device Type 00h - Direct Access • SCSI Device Type 04h - Write Once • SCSI Device Type 07h - Optical • SCSI Device Type 0Eh - Simplified Direct Access
IO Timeout for Block Devices (Removable)	The time, in seconds, (0-999, 0 = no-timeout) that the host uses to timeout I/Os for the following devices with removable media: • SCSI Device Type 00h - Direct Access • SCSI Device Type 04h - Write Once • SCSI Device Type 05h - CD-ROM • SCSI Device Type 07h - Optical • SCSI Device Type 0Eh - Simplified Direct Access
IO Timeout for Sequential Devices	The time, in seconds, (0-999, 0 = no-timeout) that the host uses to timeout I/Os for the following devices: • SCSI Device Type 01h - Sequential Access
IO Timeout for Other Devices	The time, in seconds, (0-999, 0 = no-timeout) that the host uses to timeout I/Os for devices other than the following: • SCSI Device Type 00h - Direct Access • SCSI Device Type 01h - Sequential Access • SCSI Device Type 04h - Write Once • SCSI Device Type 05h - CD-ROM • SCSI Device Type 07h - Optical • SCSI Device Type 0Eh - Simplified Direct Access

TABLE E-9 Advanced Device Properties Screen Field Descriptions *(Continued)*

Field	Description
LUNs to Scan for Block Devices	Controls LUN scans for the following devices with nonremovable media: • SCSI Device Type 00h - Direct Access • SCSI Device Type 04h - Write Once • SCSI Device Type 07h - Optical • SCSI Device Type 0Eh - Simplified Direct Access LUN 0 Only: Scan only LUN 0. All: Scan all LUNs.
LUNs to Scan for Block Devices (Removable)	Controls LUN scans for the following devices with removable media: • SCSI Device Type 00h - Direct Access • SCSI Device Type 04h - Write Once • SCSI Device Type 05h - CD-ROM • SCSI Device Type 07h - Optical • SCSI Device Type 0Eh - Simplified Direct Access. LUN 0 Only: Scan only LUN 0. All: Scan all LUNs.
LUNs to Scan for Sequential Devices	Controls LUN scans for the following device: • SCSI Device Type 01h - Sequential Access LUN 0 Only: Scan only LUN 0. All: Scan all LUNs.

TABLE E-9 Advanced Device Properties Screen Field Descriptions *(Continued)*

Field	Description
LUNs to Scan for Other Devices	Controls LUN scans for all devices other than the following: • SCSI Device Type 00h - Direct Access • SCSI Device Type 01h - Sequential Access • SCSI Device Type 04h - Write Once • SCSI Device Type 05h - CD-ROM • SCSI Device Type 07h - Optical • SCSI Device Type 0Eh - Simplified Direct Access LUN 0 Only: Scan only LUN 0. All: Scan all LUNs.
Removable Media Support	• None: Install no INT 13H interface for any Direct Access removable media devices. • Boot Device Only: Install INT 13H interface for a Direct Access removable media device if, and only if, media is present in the device at the time of BIOS initialization and either: • BBS System: The device is selected as the boot device. (Refer to the BIOS Boot Specification for a description of BBS.) • Non-BBS System: The device is set up as the boot device. The adapter to which the device is connected is specified as the first adapter (i.e., 0) in the Boot Adapter List. The device is specified as the first device in the adapter's device scan order list. • With Media Installed: Install INT 13H interfaces for Direct Access Removable Media devices if media is present in the device at the time of BIOS initialization.
Restore Defaults	Press Enter to restore the default values for all items on this screen.

E.3.10 PHY Properties Screen

The PHY Properties screen (FIGURE E-13) allows you to view and modify PHY-specific settings. TABLE E-10 describes the fields of the screen.

Note – The Link Error Settings values on this screen only display the current values for this PHY and cannot be modified. To modify the Threshold values, return to the Advanced Adapter Properties screen.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* PHY Properties -- SAS1064                                                   *
*                                                                             *
*           PHY                          2 (3rd of 4 PHYs)                    *
*           SAS Port                     2                                    *
*           Link Status                  Enabled, 3.0 Gbps                    *
*           Discovery Status             00000000                             *
*                                                                             *
*           Device Identifier            FUJITSU MAV2073RCSUN72G 0301         *
*           Scan Order                   2                                    *
*           Device Information           SAS                                  *
*           SAS Address                  500000E0:10D26642                    *
*                                                                             *
*           Link Error                   Link Error  Threshold  Threshold    *
*           Settings                     Count       Count      Time(Secs)    *
*           Invalid DWORDs                  0          0             0        *
*           Loss of DWORD Sync              0          0             0        *
*           Running Disparity Errors        0          0             0        *
*           PHY Reset Errors                0          0             0        *
*           Reset Link Error Counts                                           *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Enter = Reset Phy error logs    Alt+N = Next Phy    Alt+P = Previous Phy    *
*******************************************************************************
```

FIGURE E-13 PHY Properties Screen

TABLE E-10 PHY Properties Screen Field Descriptions

Field	Description
PHY	The PHY number for which this information applies.
SAS Port	The associated SAS Port (0 to N), as configured on this adapter.
Link Status	The PHY link status. Possible values are: • Enabled, Unknown Link Rate • PHY Disabled • Enabled, negotiation failed • Enabled, 1.5 Gbps • Enabled, 3.0 Gbps
Discovery Status	A 32-bit hexadecimal value indicating the discovery status for the PHY or expander. Currently defined values are: • Discovery Completed Successfully 0x00000000 • Loop Detected 0x00000001 • Unaddressable Device Exists 0x00000002 • Multiple Ports 0x00000004 • Expander Error 0x00000008 • SMP Timeout 0x00000010 • Out of Route Entries 0x00000020 • SMP Response Index Does Not Exist 0x00000040 • SMP Response Function Failed 0x00000080 • SMP CRC Error 0x00000100
Device Identifier	The ASCII device identifier string extracted from the device's inquiry data.
Scan Order	The scan order for this device. This is the equivalent of a SCSI ID for parallel SCSI.
Device Information	Indicates whether a device is SAS or SATA. (SATA is not supported on Sun Fire X4100 and Sun Fire X4200 servers at this time.)
SAS Address	The SAS address of this device.

TABLE E-10 *(Continued)*PHY Properties Screen Field Descriptions

Field	Description
Link Error Settings	• Invalid DWORDs: The number of invalid DWORDs that have been received, outside of PHY reset sequences, since the last PHY Link Error Reset. The count stops when it reaches the maximum value. • Loss of DWORD Sync: The number of times, since the last PHY Link Error Reset, that DWORD synchronization was lost and the link reset sequence occurred. The count stops when it reaches the maximum value. • Running Disparity Errors: The number of DWORDs with running disparity errors that have been received, outside of PHY reset sequences, since the last PHY Link Error Reset. The count stops when it reaches the maximum value. • PHY Reset Errors: The number of times the PHY reset sequence has failed, since the last PHY Link Error Reset. The count stops when it reaches the maximum value.
Link Error Count	Actual link error count values since the last PHY Link Error Reset. The counts stop when they reach their maximum value.
Threshold Count	Link error count threshold values. When a Link Error Count exceeds a Threshold Count within the Threshold Time (secs), the Fusion-MPT FW may reduce the link rate.
Threshold Time (secs)	Time, in seconds, over which to apply Threshold Count. When a Link Error Count exceeds a Threshold Count within the Threshold Time (secs), the Fusion-MPT FW may reduce the link rate.

Reset Link Error Counts	Press Enter to reset the Link Error Counts for this PHY or all PHYs. This operation issues a PHY Link Error Reset - SAS IO Unit Control Request Message.0
	Note: When you press Enter, the following prompt appears:
	`Are you sure you want to reset Phy error counts?`
	`Reset error counts for this Phy only`
	`Reset error counts for all Phys`
	`Cancel`

E.3.11 Integrated RAID Configuration and Management Screens

Integrated RAID configuration and management involves many screens, all of which are accessed by selecting RAID Properties on the Adapter Properties screen (see FIGURE E-3).

- If no RAID volumes are currently configured, you are asked to create a RAID volume.
- If at least one RAID volume is currently configured, you are shown the current volume(s) for management purposes.

The screens in the RAID configuration and management area are:

- Select New Array Type
- Create New Array
- View Array
- Manage Array

E.3.11.1 Select New Array Type Screen

Select the type of array to create, as shown in FIGURE E-14.

The two new array type options are described in the text that appears on the screen. No further explanation is needed.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Select New Array Type -- SAS1064                                            *
*                                                                             *
*                                                                             *
*      Create IM Volume        Create Integrated Mirror Array of 2            *
*                              disks plus an optional hot spare. Data         *
*                              on the primary disk may be migrated.           *
*                                                                             *
*                                                                             *
*      Create IS Volume        Create Integrated Striping array of            *
*                              2 to 8 disks.                                  *
*                              ALL DATA on array disks will be DELETED!       *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Enter = Choose array type to create     Esc = Return to Adapter Properties  *
*******************************************************************************
```

FIGURE E-14 Select New Array Type Screen

E.3.11.2 Create New Array Screen

The Create New Array screen allows you to select disks for a new array. FIGURE E-15 shows this screen. TABLE E-11 describes the fields of the screen.

For an IM volume, when the first disk is added you are asked about the data on the disks. You have two options:

- Press M to keep the existing data and migrate to an IM array. Disk synchronization will occur.
- Press D to overwrite existing data, and create a new IM array. *All data on all disks in the array will be deleted.* No synchronization occurs.

After the volume is configured, press C to create the array. You are asked to save changes, which will create the array. After the array is created, the utility returns you to the Adapter Properties screen.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Create New Array -- SAS1064                                                 *
*   Array Type:                       IM                                      *
*   Array Size(MB):                   69618                                   *
*                                                                             *
* Scan  Device Identifier             RAID   Hot    Drive      Pred  Size     *
* ID                                  Disk   Spr    Status     Fail  (MB)     *
*   2   FUJITSU MAV2073RCSUN72G 0301  [Yes]  [No]   Primary    ---    70007   *
*   3   FUJITSU MAV2073RCSUN72G 0301  [Yes]  [No]   Secondary  ---    70007   *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Space/+/- = Select disk for array or hot spare    C = Create array          *
*******************************************************************************
```

FIGURE E-15 Create New Array Screen

TABLE E-11 Create New Array Screen Field Descriptions

Field	Description
Array Type	The type of array being created: IM or IS.
Array Size	The size of the array, in Mbytes.
Scan ID	The order in which devices are scanned.
Device Identifier	The ASCII device identifier string extracted from the device's inquiry data.
RAID Disk	Specifies whether the disk is part of a RAID array (Yes or No). This field is grayed out under the following conditions: • The disk does not meet the minimum requirements for use in a RAID array. • The disk is not large enough to mirror existing data on the primary drive. • This disk has been selected as the Hot Spare for the RAID array.
Hot Spr	Specifies whether the disk is the Hot Spare for a RAID array (Yes or No). RAID Arrays are not required to have a Hot Spare. Only one Hot Spare per RAID array is permitted. You can define a Hot Spare when you create an array or at any time after creation, if the array is made up of two disks or fewer. This field is grayed out under the following conditions: • The disk does not meet the minimum requirements for use in a RAID array. • The array already has a Hot Spare. • The array is made up of the maximum number of disks (three). • The disk is not large enough to mirror existing data on the primary disk. • Integrated Striping firmware is used. (Striped arrays do not support Hot Spares.)

TABLE E-11 *(Continued)*Create New Array Screen Field Descriptions

Field	Description
Drive Status	• Ok: Disk is online and fully functional. • Missing: Disk is not responding. • Failed: Disk has failed. • Initing: Disk is initializing. • CfgOffln: Disk is offline at host's request. • UserFail: Disk is marked failed at host's request. • Offline: Disk is offline for some other reason. • Inactive: Disk has been set inactive. • Not Syncd: Data on disk is not synchronized with the rest of the array. • Primary: Disk is the primary disk for a two-disk mirror and is operating properly. • Secondary: Disk is the secondary disk for a two-disk mirror and is operating properly. • Wrg Type: Device is not compatible for use as part of a RAID array. • Too Small: Disk is too small to mirror existing data. • Max Dsks: Maximum number of disks allowed for this type of array. reached, or Maximum number of total IR disks on a controller reached. • No SMART: Disk does not support SMART, cannot be used in an array. • Wrg Intfc: Device interface (SAS) differs from existing IR disks.
Pred Fail	Indicates whether SMART is predicting device failure (Yes or No).
Size(MB)	The size of the device, in Mbytes (1 Mbyte = (1024 x 1024) = 1,048,576 bytes). If the device is part of a two-disk array, this field reflects the size of the array, not the size of the individual disk. If the device is part of an array of three or more disks, this field is the size that the disk makes up within the array. **Note:** When creating a striped array, the usable size of the array is determined by the number of drives, multiplied by the size of the smallest drive in the array. In arrays consisting of different sized drives, excess space on larger drives is unusable.

E.3.11.3 View Array Screen

The View Array screen allows you to view the current array configuration, as shown in FIGURE E-16. Press Alt+N to view the next array. Press C to create a new array. TABLE E-12 describes the fields of the screen.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* View Array -- SAS1064                                                       *
*      Array                      1 of 1                                      *
*      Identifier                 LSILOGICLogical Volume  3000                *
*      Type                       IM                                          *
*      Scan Order                 2                                           *
*      Size(MB)                   69618                                       *
*      Status                     Optimal                                     *
*                                                                             *
*      Manage Array                                                           *
*                                                                             *
* Scan  Device Identifier             RAID   Hot    Drive      Pred  Size     *
* ID                                  Disk   Spr    Status     Fail  (MB)     *
*   3   FUJITSU MAV2073RCSUN72G 0301  Yes    No     Secondary  No     69618   *
*   4   FUJITSU MAV2073RCSUN72G 0301  Yes    No     Primary    No     69618   *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Enter=Select Item  Alt+N=Next Array  C=Create an array                      *
*******************************************************************************
```

FIGURE E-16 View Array Screen

TABLE E-12 View Array Screen Field Descriptions

Field	Description
Array	The number of the array.
Identifier	The identifier of the array.
Type	The RAID type of the array.
Scan Order	The scan order of the array.
Size(MB)	The size of the array.
Status	The status of the array.
Scan ID	The order in which devices are scanned.

TABLE E-12 *(Continued)*View Array Screen Field Descriptions

Field	Description
Device Identifier	The ASCII device identifier string extracted from the device's inquiry data.
RAID Disk	Specifies whether the disk is part of a RAID array (Yes or No). This field is grayed out under the following conditions: • The disk does not meet the minimum requirements for use in a RAID array. • The disk is not large enough to mirror existing data on the primary drive. • This disk has been selected as the Hot Spare for the RAID array.
Hot Spr	Specifies whether the disk is the Hot Spare for a RAID array (Yes or No). RAID Arrays are not required to have a Hot Spare. Only one Hot Spare per RAID array is permitted. You can define a Hot Spare when you create an array or at any time after creation, if the array is made up of two disks or fewer. This field is grayed out under the following conditions: • The disk does not meet the minimum requirements for use in a RAID array. • The array already has a Hot Spare. • The array is made up of the maximum number of disks (three). • The disk is not large enough to mirror existing data on the primary disk. • Integrated Striping firmware is used. (Striped arrays do not support Hot Spares.)

TABLE E-12 *(Continued)*View Array Screen Field Descriptions

Field	Description
Drive Status	• Ok: Disk is online and fully functional. • Missing: Disk is not responding. • Failed: Disk has failed. • Initing: Disk is initializing. • CfgOffln: Disk is offline at host's request. • UserFail: Disk is marked failed at host's request. • Offline: Disk is offline for some other reason. • Inactive: Disk has been set inactive. • Not Syncd: Data on disk is not synchronized with the rest of the array. • Primary: Disk is the primary disk for a two-disk mirror and is operating properly. • Secondary: Disk is the secondary disk for a two-disk mirror and is operating properly. • Wrg Type: Device is not compatible for use as part of a RAID array. • Too Small: Disk is too small to mirror existing data. • Max Dsks: Maximum number of disks allowed for this type of array. reached, or Maximum number of total IR disks on a controller reached. • No SMART: Disk does not support SMART, cannot be used in an array. • Wrg Intfc: Device interface (SAS) differs from existing IR disks.
Pred Fail	Indicates whether SMART is predicting device failure (Yes or No).
Size(MB)	The size of the device, in Mbytes (1 Mbyte = (1024 x 1024) = 1,048,576 bytes). If the device is part of a two-disk array, this field reflects the size of the array, not the size of the individual disk. If the device is part of an array of three or more disks, this field is the size that the disk makes up within the array. **Note:** When creating a striped array, the usable size of the array is determined by the number of drives, multiplied by the size of the smallest drive in the array. In arrays consisting of different sized drives, excess space on larger drives is unusable.

E.3.11.4 Manage Array Screen

The Manage Array screen is used to manage the current array, as shown in FIGURE E-17. TABLE E-13 describes the fields of the screen.

If you select Manage Hot Spare, the utility displays a hot spare management screen that has the same layout as the Create New Array screen.

If you select Synchronize Array, Activate Array, or Delete Array, you are prompted to confirm the choice by pressing Y for yes or N for no.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Manage Array -- SAS1064                                                     *
*                                                                             *
*      Identifier                LSILOGICLogical Volume  3000                 *
*      Type                      IM                                           *
*      Scan Order                2                                            *
*      Size(MB)                  69618                                        *
*      Status                    Optimal                                      *
*                                                                             *
*      Manage Hot Spare                                                       *
*                                                                             *
*      Synchronize Array                                                      *
*                                                                             *
*      Activate Array                                                         *
*                                                                             *
*      Delete Array                                                           *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Enter = Select Item                                                         *
*******************************************************************************
```

FIGURE E-17 Manage Array Screen

TABLE E-13 Manage Array Screen Field Descriptions

Field	Description
Identifier	The identifier of the array.
Type	The RAID type of the array.
Scan Order	The scan order of the array.
Size(MB)	The size of the array.
Status	The status of the array.

TABLE E-13 Manage Array Screen Field Descriptions *(Continued)*

Field	Description
Manage Hot Spare	Press Enter to modify the array hot spare configuration. This field is grayed out under the following conditions: • The array is inactive. • The array is at its maximum number of devices. • Integrated Striping firmware is used. Striped Arrays do not support Hot Spares, so no modifications can be made to an array once it is created.
Synchronize Array	Press Enter to synchronize the RAID array. This field is grayed out under the following conditions: • The array is inactive. • The array does not need to be resynchronized. • The adapter's MPT FW does not support the feature. • Integrated Striping firmware is used.
Activate Array	This field is used to activate a RAID array.
Delete Array	This field is used to delete the currently displayed RAID array.

E.3.11.5 Exit Screen

It is important to exit the SAS BIOS Configuration Utility correctly, because some changes take effect only when you exit.

From the Adapter List, press the Esc key to exit.

In addition, a similar Exit screen appears when you exit most other screens, and it can be used to save settings. FIGURE E-18 shows the Exit screen. Some options on the Exit screen might be grayed out, indicating that they are not available at this time.

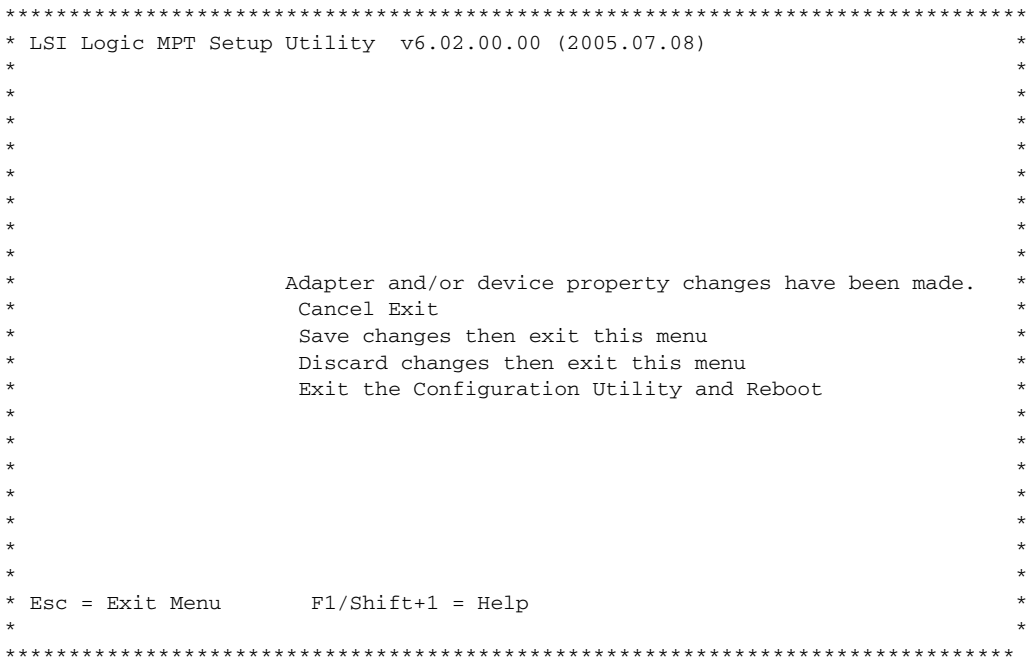

* LSI Logic MPT Setup Utility v6.02.00.00 (2005.07.08)
Adapter and/or device property changes have been made.
Cancel Exit
Save changes then exit this menu
Discard changes then exit this menu
Exit the Configuration Utility and Reboot
* Esc = Exit Menu F1/Shift+1 = Help

FIGURE E-18 Exit Screen

E.4 Performing RAID Configuration Tasks

This section contains the following information and instructions for using the Configuration Utility to set up RAID:

- Section E.4.1, "RAID Implementation and Support" on page E-41
- Section E.4.2, "Creating a RAID 0 Volume" on page E-44
- Section E.4.3, "Creating a RAID 1 Volume" on page E-45
- Section E.4.5, "Creating a Second RAID Volume" on page E-46
- Section E.4.6, "Viewing RAID Volume Properties" on page E-47
- Section E.4.4, "Managing Hot Spares" on page E-46
- Section E.4.7, "Synchronizing an Array" on page E-47
- Section E.4.8, "Activating an Array" on page E-47
- Section E.4.9, "Deleting an Array" on page E-48
- Section E.4.10, "Locating a Disk Drive" on page E-48

Note – The RAID firmware needs at least 64 MB of unused disk space at the end of each drive to store metadata.

E.4.1 RAID Implementation and Support

The LSISAS1064 controller supports the Integrated RAID hardware solution, which is a highly integrated, low-cost RAID solution. It is designed for systems requiring redundancy and high availability, but not requiring a full-featured RAID implementation.

Integrated RAID includes Integrated Mirroring (IM or RAID 1) and Integrated Striping (IS or RAID 0) technology. Integrated RAID is OS independent, easy to install and configure, and does not require a special driver. A RAID Volume is seen as a single drive by the host BIOS and OS.

The LSISAS1064 controller is based on the Fusion-MPT (Message Passing Technology) architecture. The Fusion-MPT architecture requires only a thin device driver that is independent of the I/O bus. LSI Logic provides the device drivers for various operating environments.

The ILOM Service Processor monitors the GPIOs from the SAS1064 controller. If the controller indicates a failure, the service processor lights the fault LED on the corresponding disk drive and logs the error in the SP event log.

E.4.1.1 Automatic Data Resynchronization and Hot Spares

Caution – Possible data loss: If you insert a HDD that has been configured with a RAID volume into a server that did not previously have its HDDs configured with RAID volumes, the existing HDD(s) in the server will be converted to RAID volumes during automatic synchronization and any existing data on the existing HDD(s) in the server will be erased. Before permanently removing a HDD that is part of an active RAID volume, use the LSI Configuration Utility to delete the RAID volume from the HDD to avoid causing this problem.

The SCSI parameters, including RAID volumes configuration, are set up using the LSI BIOS configuration utility accessible by pressing the CTRL+C keys during the boot process. The LSI RAID firmware and BIOS is OS-independent and you set up RAID while in MPTBIOS POST, before booting to an OS.

The parameters are saved in both the NVRAM and the disk drives. The RAID firmware needs 64 MB of unused disk space at the end of each drive to store the metadata.

The metadata stored on the disk drives contains sufficient information to restore and reactivate the RAID volumes in case the NVRAM is lost (for example, when the motherboard is replaced). However, if removed, the disk drives must first be labelled to make sure that they are placed back in the same disk bays from which they were removed when reinstalled. When the system is powered on, the RAID volumes are automatically activated and resynchronization is automatically performed.

One of the disk drives can be set up as a hot-spare disk if a RAID 1 (mirroring) volume is already set up. If one of the two disk drives used in the RAID 1 volume fails, the hot-spare drive automatically replaces it in the volume and resync is immediately performed.

It must be noted that, until the resync is completed, the system is vulnerable to a failure of the now “primary” disk (the disk left from the original mirrored volume) since full data redundancy is not yet achieved. When the bad disk is replaced, the new disk automatically becomes the new hot-spare disk for the mirrored volume.

E.4.1.2 RAID Level Support

The following items describe the RAID level support for these servers:

- RAID 1 (mirroring) is supported.
- RAID 0 (striping) is supported.
- LSI RAID 1E or IME (mirroring over more than two drives) is not supported.
- RAID 0+1 and 1+0 are not supported by the SAS1064 controller.

E.4.1.3 RAID Volume Support

The following items describe the RAID volumes supported for these servers:

- Up to two active RAID volumes are supported per system (RAID 0, RAID 1 or both).
- A striped volume (RAID 0) can contain up to four disk drives.
- A mirrored volume (RAID 1) can contain up to two disk drives.
- One disk drive can be set up as hot-spare for a RAID 1 array (one hot-spare disk per controller maximum).
- Volumes are transparent to the OS and are seen as a single physical disk drive no matter how many drives they contain.

E.4.1.4 RAID Combination Support

Possible RAID Combinations in a four-HDD server are listed below:

- Two drives RAID 0 + two drives non-RAID
- Two drives RAID 1 + two drives non-RAID
- Two drives RAID 0 + two drives RAID 1
- Two drives RAID 0 + two drives RAID 0
- Two drives RAID 1 + Two drives RAID 1
- Three drives RAID 0 + one drive non-RAID
- Four drives RAID 0
- Two drives RAID 1 + one hot-spare drive + one drive non-RAID
- Four drives non-RAID

E.4.2 Creating a RAID 0 Volume

A RAID 0 volume, also referred to as Integrated Striping (IS), offers the ability to stripe data across multiple hard disks. This can increase storage capacity and performance by combining multiple disks into one logical volume.

Note – Use RAID 0 with caution. The only advantage of RAID 0 is to improve the overall disk performance by striping data over several disk drives. By doing this, it decreases reliability because the failure of any drive within the striped volume results in a complete loss of data. In addition, any disk drive included in a RAID 0 volume becomes non-hot-swappable.

Follow these steps to create a RAID 0 volume on an adapter that does not currently have a volume configured.

1. **In the Configuration Utility, select an adapter from the Adapter List.**
2. **Select the RAID Properties option.**
3. **When you are prompted to create either an IS volume or an IM volume, select Create IS Volume.**

   The next screen shows a list of disks that can be added to a volume.
4. **Move the cursor to the RAID Disk column. To add a disk to the volume, change the "No" to "Yes" by pressing the + key, - key, or space bar.**

   As disks are added, the Array Size field changes to reflect the size of the new volume. There are several limitations when creating a RAID 0 volume:

   - All disks must be SAS (with SMART support).
   - Disks must have 512-byte blocks and must not have removable media.
   - There must be at least two drives in a valid volume.
   - No more than eight drives are allowed in a volume.
   - Hot spare drives are not allowed for RAID 0 volumes.

Note – RAID 0 does not provide any data protection in the event of disk failure. It is primarily used to increase speed.

Note – Once the number of disks in a RAID volume is set, it cannot be changed.

---

5. **When the volume has been fully configured, press C and select Save changes, then exit this menu to commit the changes.**

   The Configuration Utility will pause while the array is being created.

E.4.3 Creating a RAID 1 Volume

A RAID 1 volume, also referred to as Integrated Mirroring (IM), offers the ability to mirror data from one hard disk onto another one. This can increase reliability by combining multiple disks into one logical volume. Follow these steps to create a RAID 1 volume on an adapter that does not currently have a volume configured.

1. **In the Configuration Utility, select an adapter from the Adapter List.**
2. **Select the RAID Properties option.**
3. **When you are prompted to create either an IS volume or an IM volume, select Create IM Volume.**

   The next screen shows a list of disks that can be added to a volume.
4. **Move the cursor to the RAID Disk column. To add a disk to the volume, change the "No" to "Yes" by pressing the + key, - key, or space bar.**

   When the first disk is added, the utility will prompt you to keep existing data or overwrite existing data.
5. **Press M to keep the existing data on the first disk or press D to overwrite it.**

   If you keep the existing data, this is called a *migration*. The first disk will be mirrored onto the second disk, so the data you want to keep *must* be on the first disk added to the volume. Data on all other disks will be lost.

   As disks are added the Array Size field will change to reflect the size of the new volume. There are several limitations when creating a RAID 1 volume:

   - All disks must be SAS (with SMART support).
   - Disks must have 512-byte blocks and must not have removable media.
   - There must be two drives in a valid volume.
6. **(Optional) Add a hot spare to the volume by moving the cursor to the Hot Spare column and pressing the + key, - key, or space bar.**
7. **When the volume has been fully configured, press C and select Save changes, then exit this menu to commit the changes.**

   The Configuration Utility will pause while the array is being created.

Note – RAID 1 provides protection against the failure of a single disk. When a disk fails, it is rebuilt to a hot spare if one is available. This can greatly increase the level of protection that RAID 1 provides.

Note – Even though multiple volumes can be created, the hot spare is a global hot spare. Only one active hot spare is allowed for all volumes.

E.4.4 Managing Hot Spares

Follow these steps to add a hot spare to a RAID 1 volume.

1. **Select Manage Hot Spare.**
2. **Select a disk from the list by pressing the + key, - key, or space bar.**

Note – A hot spare must be valid RAID disk, as defined in Section E.4.3, "Creating a RAID 1 Volume" on page E-45.

---

3. **After you select the hot spare disk, press C.**
4. **Select Save changes then exit this menu to commit the changes.**

   The Configuration Utility will pause while the hot spare is being added.

   Follow these steps to delete a hot spare from a RAID 1 volume.

1. **Select Manage Hot Spare.**
2. **Remove the current hot spare disk from the list by pressing the + key, - key, or space bar.**
3. **After you clear the hot spare, press C.**
4. **Select Save changes then exit this menu to commit the changes.**

   The Configuration Utility will pause while the hot spare is being removed.

E.4.5 Creating a Second RAID Volume

The LSI Logic SAS controllers support two active RAID volumes. If one volume is already configured, follow these steps to add a second volume.

1. **In the Configuration Utility, select an adapter from the Adapter List.**
2. **Select the RAID Properties option.**

   This displays the current volume.

3. **Press C to create a new volume.**
4. **Create the new volume:**
   - To create a second RAID 0 volume, continue with Step 2 of Section E.4.2, "Creating a RAID 0 Volume" on page E-44.
   - To create a second RAID 1 volume, continue with Step 2 of Section E.4.3, "Creating a RAID 1 Volume" on page E-45.

E.4.6 Viewing RAID Volume Properties

Follow these steps to view the properties of RAID volumes.

1. **In the Configuration Utility, select an adapter from the Adapter List.**
2. **Select the RAID Properties option.**
   The properties of the current volume are displayed.
3. **If more than one volume is configured, press Alt+N to view the next array.**
4. **To manage the current array, press Enter when the Manage Array item is selected.**

E.4.7 Synchronizing an Array

Synchronizing an array means that the firmware synchronizes the data on the secondary disk(s) with the data on the primary disk of the mirror. Follow these steps to start a synchronization for a RAID 1 volume.

1. **Select Synchronize Array.**
2. **Press Y to start the synchronization, or N to cancel it.**

Note – If the server is rebooted before the volume synchronization is completed, the resync resumes when the server boots.

E.4.8 Activating an Array

An array can become inactive if, for example, it is removed from one controller or computer and moved to another one. The Activate Array option enables you to reactivate an inactive array that has been added to a system. This option is only available when the selected array is currently inactive.

1. **Select Activate Array.**
2. **Press Y to proceed with the activation, or press N to abandon it.**
   After a pause, the array becomes active.

E.4.9 Deleting an Array

Caution – Before deleting an array, be sure to back up all data on the array that you want to keep.

Follow these steps to delete a selected array.

1. **Select Delete Array.**
2. **Press Y to delete the array, or press N to abandon the deletion.**

   After a pause, the firmware deletes the array.

Note – Once a volume has been deleted, it cannot be recovered. When a RAID 1 volume is deleted, the data is preserved on the primary disk. The master boot records (MBR) of other disks in the array are deleted. For other RAID types, the master boot records of all disks are deleted.

E.4.10 Locating a Disk Drive

There are several ways to physically locate a disk drive, as long as the firmware is correctly configured and the drives support disk location.

- During RAID creation, when a disk is set to Yes as part of a RAID volume, its locate LED is enabled. When it is set back to No or the RAID volume is created, the locate LED is cleared.
- Disks can also be located from the SAS Topology screen. To locate a disk, move the cursor to the disk and press Enter. The Locate LED on the disk remains activate until the next key is pressed.

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